DRAFT
REMEDIAL ALTERNATIVES AND REMEDIAL IMPLEMENTATION PLAN

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EXECUTIVE SUMMARY

TRC Environmental Corporation (TRC) prepared this report for the City of Lawrence ("the City") to evaluate the environmental assessment and remediation work completed to date for the Manchester Street Park Site located at 85 Manchester Street in Lawrence, Massachusetts (the "Site"). The purpose of this evaluation is to assess the feasibility of re-using the Site as a passive recreational park. Our assessment concludes that a portion of the Site requires remediation of surface soil (0-3 feet) prior to park development. This report also includes a Remedial Implementation Plan (RIP), which details the environmental activities related to the construction of the park.

The Site was formerly the Lawrence Thermal Conversion Facility. Between 1991 and 2003 several environmental investigations and remedial response actions were performed at the Site by the former owner to address oil and hazardous materials identified in soil at the Site. The Site was closed with a Class A-3 Response Action Outcome (RAO) Statement in December 2005. The RAO was based on a Method 3 Risk Characterization that evaluated several exposure scenarios for both current and future land use. Based on current land use, potential human receptors at the Site included recreational fishers in Stevens Pond, emergency utility worker, and trespassers. Based on the projected future land use at the Site as a parking lot, potential human receptors included construction workers and landscapers. No Significant Risk was found under the exposure scenarios considered in the Method 3 Risk Characterization. However, all of the exposure scenarios evaluated shorter exposure periods and intensity levels than a future recreational user of the Site.

TRC conducted a focused Method 3 Risk Characterization to evaluate risk to a recreational user of the future park. The risk characterization concludes that, under current Site conditions, the cumulative cancer risk level exceeds the Massachusetts Department of Environmental Protection (DEP) maximum acceptable excess lifetime cancer risk. The majority of the risk is from arsenic and benzo(a)pyrene in surface soil.

Three remediation alternatives intended to reduce the risk to acceptable levels for recreational use were identified and evaluated. TRC concluded that the most feasible remediation alternative is to cap the existing impacted soil in the areas of elevated arsenic and benzo(a)pyrene. Capping with 3 feet of clean soil would eliminate exposure to the soil and thus eliminate future exposure. Based on a rough cost estimate, capping of the Site would cost approximately $161,300 to implement.

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ABBREVIATIONS AND ACRONYMS

AMEC	AMEC Earth and Environmental, Inc.
AUL	Activity and Use Limitation
B&C	Brown and Caldwell
CMR	Code of Massachusetts Regulations
COC	Contaminant of Concern
CSA	Comprehensive Site Assessment
DEP	Department of Environmental Protection
FSSV	Freshwater Sediment Screening Values
HI	Hazard Index
HQ	Hazard Quotient
MCP	Massachusetts Contingency Plan
mg/kg	milligrams per kilogram
NOR	Notice of Responsibility
PAHs	Polycylic Aromatic Hydrocarbons
PCBs	Polychlorinated biphenyls
pg/g	picograms per gram
QC	Quality Control
RAP	Remedial Action Plan
RAO	Response Action Outcome
RDF	Refuse Derived Fuel
RIP	Remedial Implementation Plan
RTN	Release Tracking Number
TCDD	Tetrachlorinated dibenzo dioxin
TEQ	Toxicity Equivalent
The City	The City of Lawrence
TPH	Total petroleum hydrocarbons
TRC	TRC Environmental Corporation
VOCs	Volatile organic compounds

1.0 INRODUCTION

TRC Environmental Corporation (TRC) prepared this report for the City of Lawrence, Massachusetts to provide a Phase III Remedial Action Plan (RAP) and a Phase IV RIP for the Manchester Street Park located at 85 Manchester Street in Lawrence, Massachusetts (the Site).

Brown & Caldwell (B&C), on behalf of the p Site owner, Covanta, completed previous environmental assessment and remediation of the Site under the Massachusetts Contingency Plan (MCP). B&C submitted a Class A-3 RAO for the Site in December 2005 with an Activity and Use Limitation (AUL) which restricts future use to industrial purposes, parking lot usage, or equivalent.

As part of this report, TRC performed the following tasks:

- Reviewed Site history.
- Reviewed MCP deliverables.
- Reviewed and evaluated existing risk characterization and its applicability to proposed future Site use as a passive recreational park.
- Assessed human health risks considering exposure to potential future passive recreational user.
- Evaluated remedial alternatives necessary to re-develop the Site as passive recreation park with No Significant Risk to human health.
- Prepared a RIP to excavate soils, reuse excavated soils onsite and place a cap of clean fill over the Site.

2.0 SITE DESCRIPTION

The Manchester Street Park is located at 85 Manchester Street in Lawrence, Massachusetts. A Site location map is presented in Figure 1-1. Formerly the Site was the Lawrence Thermal Conversion Facility. The Site is located in an area that is mostly industrial, with commercial and industrial businesses located adjacent to the property and across Stevens Pond.

The property consists of both paved and unpaved areas. All former buildings on the property have been removed. The Site [Release Tracking Number (RTN) 3-19158] as defined by B&C comprises the majority of the property and a portion of Stevens Pond located along the eastern property boundary. A Site plan is shown in Figure 1-2.

Access to the Site is presently unrestricted and can be obtained via Manchester Street. The areas in the footprint of the Former Fossil Fuel Building and the Former Refuse Derived Fuel (RDF) Buildings appear to have been backfilled with crushed building debris. Other portions of the Site are either unpaved or covered by a cobblestone layer.

The Site has a long history of industrial use dating back to the 1800s. Examples of industrial uses include an icehouse company, power generation, manufacturing, and a railroad yard. Large quantities of coal, No. 6 oil, No. 4 oil, and No. 2 fuel oil have reportedly been stored and used at the Site throughout its history.

2.1 Regulatory History

The following is a summary of the site assessment activities and associated DEP correspondence completed for the site:

August 1991 – Oil-contaminated soils were encountered during the removal of an underground 10,000-gallon No. 2 fuel oil tank. The contamination was limited to a small area around the fill pipe. The spill was reported to the DEP and assigned the release Case Number 3-2406R. Contaminated soil was excavated and removed. Five monitoring wells were installed on the site. Post-excavation samples and groundwater samples did not contain detectable Total Petroleum Hydrocarbons (TPH) or volatile organic compounds (VOCs). The case was closed as of September 1992.

1991 – The facility reported to the DEP a leak of up to 50 gallons of transformer oil. DEP assigned release Case Number N92-0517 to the spill. Soil samples contained TPH and trace amounts of polychlorinated biphenyls (PCBs). Contaminated soil was removed and disposed. Post-excavation samples did not contain detectable levels of TPH. The DEP categorized the release as a spill/leak "with no further emergency remedial actions" required.

December 4, 1992 – The facility encountered oil contaminated soil during the removal of an 800-gallon AST. DEP assigned release Spill Number N92-1590. The DEP was notified and issued a Notice of Responsibility to Ogden on December 15, 1992. Impacted soil was removed from the site. On March 12, 1993, a Release Categorization Form was submitted to the DEP requesting the site to be classified as a spill/leak. The DEP categorized the release as "case closed".

April 1996 – A 50-gallon release of No. 4 fuel oil was reported to the DEP and assigned RTN 3-13636. The fuel oil was removed using absorbent material and disposed offsite. A Class A-1 RAO Statement was submitted to DEP on July 19, 1996.

August 25, 1996 – The facility notified the DEP of a threat of release of hazardous material (Sulfuric Acid), subject to 2-hour notification requirements. The acid was contained within the secondary containment berm inside the Fossil Fuel Building. The DEP issued the release RTN 3-14146. A Class A-1 RAO Statement was submitted to DEP on October 25, 1996.

October 1996 – The facility notified the DEP of a 600-gallon release of No. 4 oil. RTN 3-14333 was issued by the DEP. Under the supervision of a LSP, impacted soils were excavated and disposed of at an off-site facility. Post-excavation soil samples were below MCP standards for residential soils for extractable petroleum hydrocarbons (EPH). Groundwater samples were MCP Method 1 GW-2/GW-3 standards for EPH. A Class A-2 RAO Statement was submitted to DEP on February 6, 1997.

2.2 MCP Compliance History for RTN 3-19158

On January 7, 2000, the facility submitted to DEP a Release Notification and Retraction Form to report exceedances of MCP reportable concentrations in soils. The DEP assigned RTN 3-19158 to the site. A Notice of Responsibility (NOR) was issued by the DEP on April 12, 2000.

In January 2001, a Phase I Initial Site Investigation Report and Tier Classification was submitted to the DEP for RTN 3-19158 by AMEC Earth and Environmental, Inc. (AMEC) on behalf of the facility. The site was classified as Tier II.

A Phase II Comprehensive Site Assessment (CSA) was submitted to DEP in January 2004. The Phase II CSA concluded that polycyclic aromatic hydrocarbons (PAHs), lead, arsenic, and dioxin were present in soil at concentrations exceeding applicable MCP Method 1 S-3/GW-3 standards. Two dioxin hotspots were identified in soil within one foot of the ground surface. On January 5 and 6, 2004, a RAM was conducted to remove the dioxin hotspots identified in the Phase II CSA. A total of 266 tons of soil was removed from Excavation Areas A and B as shown on Figure 1-1. B&C asserted in the Phase II CSA that the remaining concentrations of contaminants following RAM excavations were attributable to background historical conditions relating to urban fill and other possible sources associated with previous historical uses of the Site. B&C concluded that a condition of "No Significant Risk" existed at the Site.

In Fall 2004, DEP conducted an audit of the Site and disagreed with the assertion by B&C that soil contamination was consistent with background. DEP found that some contaminant concentrations were detected above published background concentrations and inconsistent with background. As a result of the audit, B&C completed supplemental Phase II assessment activities at the Site. In addition, between December 2004 and March 2005, an additional 3,233 tons of soil were excavated from the top 6 to 12 inches across much of the Site and disposed off site as part of a Modified RAM. The Supplemental Phase II CSA and RAM Completion Report were submitted to DEP in April and May 2005, respectively.

A Method 3 Risk Characterization prepared by Menzie-Cura & Associates was presented in the Supplemental Phase II CSA Report (B&C 2005), to characterize the risk of harm to health, public welfare, safety and the environment posed by the Site. The risk assessment concluded that a condition of "No Significant Risk" exists at the Site, however, the risk assessment assumes that an Activity and Use Limitation (AUL) that restricts future uses to commercial/industrial will be recorded with the property deed, because some Site soils exceed MCP Method 1 S-3/GW-3 Standards, and some Site sediments exceed Freshwater Sediment Screening Values (FSSV) for PAH and metals. Dioxin was also detected in site sediments but does not have a FSSV. The Stage II Environmental Risk Characterization found no significant risk from sediment.

A Class A-3 RAO was submitted to DEP in December 2005. The RAO concluded that Site contaminants pose No Significant Risk to human health. However, the RAO relies on an AUL that restricts future use to industrial purposes, parking lot usage, or equivalent.

2.3 Summary of Existing Activity and Use Limitations

The AUL was implemented at the Site to support the Class A-3 RAO by restricting direct contact exposure to contaminated Site soil. Specifically, the AUL prohibits future use of the Site for residential, agricultural, and institutional uses. The provisions of the AUL are described below. A copy of the existing AUL is provided in Appendix B.

2.3.1 Activities and Uses Permitted under the AUL

The AUL Opinion provides that a condition of No Significant Risk to health, safety, public welfare or the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.000) so long as any of the following activities and uses occur on the Property:

(i) Industrial uses, including but not limited to a parking lot;
(ii) Underground utility and/or construction activities including maintenance, or repair of site improvements, or utility repair and maintenance, excavation, movement and handling of soils provided that such activities are conducted in accordance with a Soil Management Plan and a Health and Safety Plan;
(iii) Such other activities or uses which, in the opinion of an LSP, shall present no greater risk of harm to health, safety, public welfare or the environment than the activities and uses set forth in this Paragraph; and
(iv) Such other activities and uses not identified in Section 2.3.2 as being Activities and Uses inconsistent with the AUL.

2.3.2 Activities and Uses Restricted under the AUL

Activities and uses which are inconsistent with the objectives of the AUL , and which, if implemented at the Property, may result in significant risk of harm to health, safety, public welfare or the environment or in a substantial hazard, are as follows:

(i) Residential uses, including but not limited to, one family or two-family dwellings, apartments, tenement houses, condominiums or town houses, mobile homes, lodging houses, nursing or rest homes, or dormitories;
(ii) Agricultural uses, including but not limited to tilling and planting of gardens or crops for human consumption;
(iii) Institutional uses, including, but not limited to public or private schools, day care facilities, public libraries, museums, or hospitals;
(iv) Activities or uses which are likely to involve the removal or disturbance of the soil at the Property with the exception of underground utility and/or construction work carries out in accordance with a Soil Management Plan and a Health and Safety Plan;
(v) Any use or activity that may involve direct contact to the soil, or any use or activity that may not comply with a Soil Management Plan and a Health and Safety Plan.

2.4 Summary of Residual Site Contamination

Tables of existing Site data for soil, groundwater, and fish tissue are presented in Appendix A.

2.4.1 Soil

The primary Site constituents in soil, based on toxicity, are arsenic, benzo(a)pyrene, and dioxin. Remaining arsenic concentrations in soil at the Site range from 6 mg/kg (S-5) to 160 mg/kg (TP-2). Elevated arsenic concentrations are located primarily on the northern portion of the Site. PAHs were detected in most soil samples across the Site. The highest concentrations of PAHs were detected in RAM confirmatory soil sample S-8, where benzo(a)pyrene was detected at a concentration of 17 mg/kg. Similar to PAHs, dioxin was also detected in soil samples across the entire Site. The maximum concentration of dioxin [as 2,3,7,8-tetrachlorinated dibenzo dioxin (TCDD) Toxicity Equivalent (TEQ)] was detected in sample S-5(3-5') at a concentration of 77.4 picograms per gram (pg/g).

2.4.2 Groundwater

According to the Phase II CSA (B&C 2004), no exceedances of MCP Method 1 GW-3 standards were detected in on-Site monitoring wells based on two rounds of groundwater sampling conducted by B&C.

2.4.3 Sediment

Metals, PAHs, and dioxin were detected in sediment samples collected upgradient and downgradient from the Site. The Stage II Environmental Risk Characterization conducted in the Method 3 risk assessment concluded that there is no significant risk of harm to ecological receptors from contaminants of concern in Stevens Pond.

3.0 SITE OBSERVATIONS AND DOCUMENT REVIEW FINDINGS

3.1 Site Walk to Confirm Existing Conditions

On Friday, May 5, 2006, TRC conducted a Site walk to assess whether existing Site conditions are consistent with Site conditions described in the RAO. There are no buildings or structures on Site. Several box trailers are currently being stored on the property. .

The areas in the footprint of the Former Fossil Fuel Building and the Former RDF Buildings appear to have been backfilled with crushed debris generated from demolition of these buildings. The footprint of the Former Fossil Fuel Building is apparently being used as a parking area for workers of the adjacent commercial produce company. Other portions of the Site are either unpaved or covered by a cobblestone layer.

Access to the Site is presently unrestricted and can be obtained via Manchester Street at the southern end of the property. Vehicular access to the northern portion of the Site is restricted by concrete blocks located between the Former RDF Building and Building 8. Access to the property from the north is restricted by a gate. Past the gate is a railroad bridge leading to the Malden Mills facility.

Based on TRC's Site walk, conditions appear to be consistent with those described in the RAO report, and current Site use appears to be consistent with the provisions of the AUL, described below.

3.2 Adequacy of Site Testing

A summary of data supporting the RAO and used in the Method 3 risk characterization is provided in Appendix A. While there are no specific requirements for the number of samples to support an RAO, the quantity and locations of the samples collected by B&C appear to adequately support the LSP opinion and conform to standard practices.

3.3 Adequacy of Laboratory Data

Revisions to the MCP in April 2006 require for all Class A, B, or C RAOs: (i) a Data Usability Assessment documenting that the data relied upon is scientifically valid and defensible, and of a sufficient level of precision, accuracy, and completeness to support the RAO, and (ii) a Representativeness Evaluation, documenting the adequacy of the spatial and temporal data sets to support the RAO.

Upon completion of any future Site remediation and development which results in Site activity and use not specifically permitted by the AUL, a statement about data usability will be necessary to accompany the revised RAO. To get an indication of the usability of the existing Site data, TRC performed a limited data review on ten sets of dioxin and furan data from three different laboratories on various groundwater, soil, and sediment samples collected at the Site. The data were reviewed for method compliance and any serious quality control (QC) nonconformances.

The samples were collected from 1999 to 2003. The complete TRC data review is included in Appendix C.

In general, the data are valid as reported and may be used for decision-making purposes. Minor QC nonconformances included trace levels of blank contamination, high laboratory control sample recoveries, low surrogate recoveries, quantitation at concentrations exceeding the instrument calibration range, and matrix interference. If data validation had been performed, these selected data points would likely only be qualified as estimated; however; potential low or high biases may exist which may warrant further evaluation before the data are used for a risk assessment. One significant QC nonconformance was noted in one soil sample (CL-SS1-TP2) where detector saturation was discovered; a more in-depth review of the data showed that this nonconformance may result in the qualification of results as estimated or may even potentially result in rejection of the results due to a severe low bias. Note that sample CL-SS1-TP2 was removed from the Site during RAM excavation activities.

It should also be noted that the different laboratories used various methods for calculation of the TEQs and therefore, the laboratory calculated TEQs are not comparable. In addition, TEQs were not calculated in accordance with DEP guidelines and a calculation error was noted in a spot check of one TEQ. Prior to a risk assessment being performed, it is recommended that all TEQs be recalculated in accordance with DEP guidelines.

3.4 Validity of Existing Risk Characterization and Assumptions

In the Method 3 Risk Characterization prepared by Menzie-Cura & Associates, human health exposure scenarios were evaluated for both current and future land use. Based on current land use, potential human receptors at the Site included recreational fishers (anglers) in Stevens Pond, emergency utility workers, and trespassers. Based on projected future land use at the Site as a parking lot, potential human receptors included construction workers and landscapers. Assumed exposure scenarios for these potential receptors are as follows.

Fisher – Anglers are assumed to be exposed to Site-related contaminants of concern (COCs) by consuming fish from Stevens Pond. The risk characterization assumed consumption of fish by the angler for 30 years (ages 1-31). The angler is further assumed to eat primarily bottom-feeding fish (e.g., carp) that are more closely associated with the sediment, and thus have more exposure to contamination in sediment.

Utility Worker – A utility worker is defined as a person that conducts repairs (e.g., water, sewage, gas, or electric) located on the Site. A utility worker is potentially exposed to soil at a depth of 0 to 6 feet while conducting emergency utility repairs at underground utilities located at the Site. A utility worker is assumed to be exposed to COCs in soil from dermal contact, incidental ingestion, and inhalation of fugitive dust.

Trespasser – Trespassers are potentially exposed to soil at the Site for brief periods. A trespasser could be exposed to COCs in soil from dermal contact, incidental ingestion, and inhalation of fugitive dust. The risk characterization quantitatively evaluated a teenager, aged 11 to 18 years old, trespassing at the Site over a period of 7 years. The trespasser is expected to

come into contact with soil while sitting, walking, and other low to medium intensity activities. The trespasser is assumed to be exposed to contamination for 2 hours per day, 2 days per week, 7 months per year (April to October).

Future Construction Worker – The future construction worker is potentially exposed to soil and groundwater during excavation activities for a future construction project (i.e., parking lot). The construction worker is assumed to be exposed to COCs in soil from dermal contact, incidental ingestion, and inhalation of fugitive dust, and from COCs in groundwater from dermal contact. The risk characterization quantitatively evaluated a future adult worker, aged 22 years old, conducting excavation work at the Site. The construction worker is assumed to be exposed to Site media for an 8-hour work day, 5 days per week, during a 6-month construction project.

Future Landscaper – The future landscaper will potentially be exposed to soil while regularly landscaping and otherwise maintaining any green space that might remain following construction of a parking lot. A landscaper is assumed to be exposed to COCs in soil from dermal contact, incidental ingestion, and inhalation of fugitive dust. The risk characterization quantitatively evaluated an adult landscaper, aged 18 to 43 years old, maintaining the unpaved portions of the Site for 25 years of employment. The landscaper is assumed to work at the Site 4 hours per day, one a week, 7 months per year (April to October).

No Significant Risk was found under the exposure scenarios considered in the Method 3 Risk Characterization. The assumed exposure scenarios appear to be valid for the current and projected Site use. However, all of the exposure scenarios evaluated considered shorter exposure periods and intensity levels than a future recreational user of the Site. Therefore, a supplemental Method 3 Risk Characterization would be required to assess risk associated with future Site development as a park. This supplemental Method 3 Risk Characterization is provided in Section 4.0

4.0 EVALUATION OF POTENTIAL RISK TO PARK USERS

This section summarizes the focused Method 3 Risk Characterization performed by TRC for a future recreation user of the Site. Documentation of the methodology, exposure assumptions, and risk summary tables are provided in Appendix D.

4.1 Overview

Potential cancer risks and non-carcinogenic health hazards were quantified for the future recreational user by combining estimated COC intakes with the COC's appropriate toxicity value for the exposure under consideration.

The risk characterization procedure for carcinogenic chemicals derives an excess lifetime cancer risk estimate, which is the excess lifetime risk (i.e., over background risk levels) of incurring cancer from exposure. Cancer risks within and between different exposure pathways are summed to derive a total excess lifetime cancer risk, which is compared with the maximum acceptable excess lifetime cancer risk adopted by DEP: a risk of one-in-one-hundred-thousand, denoted as $1x10^{-5}$. A total excess lifetime cancer risk at or below $1x10^{-5}$ represents no significant risk of harm to human health.

The risk characterization procedure for non-carcinogenic chemicals derives a Hazard Quotient (HQ), which is the ratio of an estimated exposure or intake to an exposure or intake judged to pose no health hazard. HQs within and between different exposure pathways are summed to derive a total Hazard Index (HI), which is compared with the maximum acceptable HI adopted by DEP: one (1). A total HI equal to or below one represents no significant risk of harm to human health.

4.2 Risk Characterization for Recreational Users

Risk characterization results for recreational users are presented in Appendix D and summarized in the following table:

RECREATIONAL USER RISK CHARACTERIZATION SUMMARY		
Exposure Pathway	Total Hazard Index	Excess Lifetime Cancer Risk
	Combined Adult, Youth, Child	Combined Adult, Youth, Child
Soil ingestion	0.34	$2x10^{-5}$
Soil dermal contact	0.20	$1x10^{-5}$
Inhalation of particulates	< 0.01	$3x10^{-7}$
Ingestion of Stevens Pond Fish Tissue	0.73	$3x10^{-6}$
Total (all pathways)	**1.3***	**$3x10^{-5}$**
Maximum Acceptable Level	**1**	**$1x10^{-5}$**
* The chemicals contributing to this HI are arsenic in soil (HQ = 0.42), copper in soil (HQ = 0.11), and mercury in fish tissue (HQ = 0.68). Because these chemicals affect different organs or systems, the risk is not cumulative. Therefore, since individual HQs are below the maximum acceptable level, the non-carcinogenic risk is within DEP limits.		

The cumulative cancer risk level associated with exposure to both soil and fish tissue for the combined child, youth and adult recreational receptor is $3x10^{-5}$, which exceeds the maximum acceptable excess lifetime cancer risk of $1x10^{-5}$. The majority of the cancer risk is from arsenic and benzo(a)pyrene in soil and dioxin/furans in fish tissue.

The cumulative HI for exposure to soil and fish tissue is 1.3, which slightly exceeds the acceptable HI of 1. However, the chemicals contributing to this HI are arsenic in soil (HQ = 0.42), copper in soil (HQ = 0.11), and mercury in fish tissue (HQ = 0.68). Because these chemicals affect different organs or systems in the human body, the risk is not cumulative. Therefore, since individual HQs are below the maximum acceptable level, the non-carcinogenic risk is within DEP limits.

5.0 REMEDIATION ALTERNATIVES EVALUATION

In this section, cleanup goals, based on results of the focused risk characterization described in Section 4.0, are developed. Also, several alternatives for Site remediation which meet the cleanup goals are identified and evaluated.

5.1 Development of Cleanup Goals

Based on the focused risk characterization described in Section 4.0, the primary Site contaminants posing risk to future recreation users are arsenic and benzo(a)pyrene present in surface soil. Exposure to these compounds would need to be controlled to reduce the potential cancer risk below the acceptable level of $1x10^{-5}$.

Massachusetts DEP's Guidance for Disposal Site Risk Characterization states that contaminants present at concentrations below background levels may be excluded as contaminants of concern. Therefore, if concentrations of arsenic and benzo(a)pyrene are reduced to levels below background, they may be removed from the risk assessment. According to DEP's Technical Update, *Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil*, the recommended background levels for arsenic and benzo(a)pyrene in soil containing coal ash or wood ash associated with fill material are 20 mg/kg and 7 mg/kg, respectively.

5.2 Identification of Remedial Alternatives

TRC has identified three potential remedial alternatives to address the risk due to surface soil contamination. These alternatives consider the proposed future development as a park. Refer to conceptual park plans in Appendix E. The three potential remedial alternatives identified by TRC are as follows.

- Excavation, Off-Site Disposal, and Backfill
- Pre-Characterization and Targeted Excavation and Off-Site Disposal of Select Soil
- Capping in Place

Remedial alternatives are based on an impacted area of 36,500 square feet. This area is identified as "Approximate Work Area" in Figure 1-1.

Several contingencies for scope, project management, and construction management are added to each remedial alternative cost.

5.3 Evaluation of Alternatives

5.3.1 Remedial Alternative 1 - Excavation, Off-Site Disposal, and Backfill

Remedial Alternative 1 consists of excavating all surface soil (0-3 feet) that exceeds cleanup levels based on the existing data presented in the RAO (B&C 2005). Under this alternative, approximately 4,056 cubic yards of soil will be excavated using standard excavation equipment. The excavated soil would be subsequently loaded onto trucks and transported to a permitted off-

site recycling/re-use/disposal facility. Immediately following excavation, a geotextile barrier will be installed, and the Site would be backfilled to previously existing grades using clean, imported backfill material.

Pursuant to the MCP 310 CMR 40.1067 (4)(b), excavation activities will be conducted under a RAM, which will include the preparation of a Health and Safety Plan and a Soil Management Plan. After completion of Site activities, the existing AUL will be amended to permit the use of the Site as a passive recreation park. Pursuant to the MCP 310 CMR 40.1067 (4)(d), a revised RAO addressing the areas where RAM activities occurred will be prepared and submitted to DEP.

The total estimated cost for Remedial Alternative 1 is $1,000,000.

5.3.2 Remedial Alternative 2 - Pre-Characterization and Targeted Excavation and Off-Site Disposal of Select Soil

Remedial Alternative 2 is similar to Remedial Alternative 1, except it includes a soil pre-characterization assessment to delineate areas with elevated levels of arsenic and PAHs prior to excavation. The purpose of the pre-characterization assessment is to reduce the volume of soil requiring off-site disposal. The pre-characterization sampling plan would need to be submitted to the current Site owner for approval prior to starting.

Soil will be excavated similar to Remedial Alternative 1, and post-excavation confirmatory soil samples for arsenic and PAHs will be collected to confirm that concentrations of arsenic and benzo(a)pyrene are below background levels. For the purpose of this evaluation, a one-third reduction in soil requiring off-site disposal is assumed.

Similar to Remedial Alternative 1, excavation activities will be conducted under a RAM, the existing AUL will be amended to permit the use of the Site as a passive recreation park, and a revised RAO addressing only the areas where RAM activities occurred will be prepared and submitted to DEP.

The total estimated cost for Remedial Alternative 2 is $700,000.

5.3.3 Remedial Alternative 3 - Capping in Place

Remedial Alternative 3 consists of leaving the soil in place and covering it with a geotextile and three feet of clean fill to eliminate potential exposure. Under this alternative, no soil will be removed from the Site, but approximately 4,056 cubic yards of clean soil will be imported resulting in a grade increase of three feet across a large portion of the Site.

Regulatory compliance submittals to DEP will include those described in Alternatives 1 and 2, plus the preparation and submittal a of a Phase III evaluation of remediation alternatives per the MCP provisions for a RAM under 40 CMR 40.0442(4).

The total estimated cost for Remedial Alternative 1 is $200,000.

5.4 Comparison and Selection of Remedial Alternative

A comparison of advantages and disadvantages of the three remedial alternative described above is presented in Table 5-4. Based on the comparison, Remedial Alternative 3 is the lowest cost option. The major disadvantage to Remedial Alternative 3 is that the existing grade of a large portion of the Site will be raised by 3 feet. If final park development plans can incorporate this increase in grade, then Remedial Alternative 3 is the most feasible option.

6.0 SELECTION OF REMEDIAL ALTERNATIVE

TRC has completed the feasibility assessment for the City related to the re-use of the Site as a passive recreational park. Our assessment concludes that a portion of the Site requires remediation of surface soil (0-3 feet) prior to park development.

The Site was closed with a Class A-3 RAO Statement in December 2005. The RAO was based on a Method 3 Risk Characterization that evaluated several exposure scenarios for both current and future land use. Based on current land use, potential human receptors at the Site included recreational fishers in Stevens Pond, emergency utility worker, and trespassers. Based on projected future land use at the Site as a parking lot, potential human receptors included construction workers and landscapers. No Significant Risk was found under the exposure scenarios considered in the Method 3 Risk Characterization. The assumed exposure scenarios assumed appear to be valid for the current and projected Site use. However, all of the exposure scenarios evaluated shorter exposure periods and intensity levels than a future recreational user of the Site.

TRC conducted a focused Method 3 Risk Characterization to evaluate risk to a recreational user of the future park. The risk characterization concludes that, under current Site conditions, the cumulative cancer risk level exceeds the DEP maximum acceptable excess lifetime cancer risk. The majority of the risk is from arsenic and benzo(a)pyrene in surface soil.

Three remediation alternatives intended to reduce the risk to acceptable levels were identified and evaluated. TRC concluded that the most feasible remediation alternative is to cap the existing impacted soil in the areas of elevated arsenic and benzo(a)pyrene. Capping with a geotextile and 3 feet of clean soil would eliminate exposure to the soil and thus eliminate future exposure. Based on a rough cost estimate, capping of the Site would cost approximately $161,300 to implement.

7.0 REMEDIAL IMPLEMENTATION PLAN

The following parties will be involved in the implementation of the RIP detailed in this section:

Responsible Party:	The City of Lawrence 147 Haverhill Street Lawrence, MA 01840
Site LSP:	Matt Robbins, LSP #9495 TRC 650 Suffolk Street, Suite 200 Lowell, MA 01854
Site Civil Engineer:	TEC Inc. 65 Glen Street Lawrence, MA 01843
Site Landscape and Grading:	The Collaborative 122 South Street Boston, MA 02110

7.1 Regulatory Requirements

In Massachusetts, the excavation and management of contaminated soil and groundwater at is regulated by the MCP. The purpose of the MCP is "to provide for the protection of health, safety, public welfare and the environment" by instituting a uniform mechanism for identifying contaminated soils and groundwater and implementing appropriate response actions.

7.2 Soil Management Procedures

Although off-site disposal of soil is not anticipated, soil will be excavated along approximately 300 feet of Steven's Pond shoreline to construct the soil cap. Because this soil may contain elevated concentrations of arsenic and benzo(a)pyrene this material shall be managed properly to minimize exposure to Site workers and down-wind receptors..

7.2.1 Soil Excavation and Management Requirements

The Work shall be performed in conformance with all applicable Federal, state and local regulations governing hazardous waste, contaminated material, and soil waste. Excavation, material handling and stockpiling of soil, where needed, shall be performed in a manner that limits the mixing of materials containing different levels and types of contamination to the highest degree possible. Minimum soil excavation and management procedures are as follows:

7.2.1.1 Construction Plans and Specifications

Earthwork and grading specifications are provided with in Appendix F.

7.2.1.2 Site Setup

1. All excavated soil is to be used on-site as fill in low spots prior to the addition of the three foot cap of clean soil. A majority of the excavation activities will occur along the edge of Steven's Pond. This excavation will be conducted as to ensure that cap can be added to the shore of the pond without altering the current shoreline. Excavation in this area will be to a depth of three feet below ground surface or the water table, which ever occurs first. Minor excavation activities may occur at other locations across the site to allow for the creation of gentler slopes.

2. All equipment used of excavation of impacted soils shall be decontaminated before leaving the Site or being used to move clean fill. Traffic moving from contaminated soil areas to clean soil should be decontaminated before leaving the contaminated soil to limit cross contamination.

3. The contractor will be required to register all trucks and equipment that will be used for this project with the City of Lawrence prior to beginning work.

4. Staked hay bales and silt fence will be installed along the shoreline for Stevens Pond to control sedimentation. The hay bales and silt fence will be maintained for the duration for the duration of the project.

7.2.1.3 Site Excavation

1. Soil excavation shall be performed in accordance with generally accepted excavation/construction practices and all applicable requirements of the Occupational Safety and Health Administration (OSHA). The preferred method of excavation is to be direct dumping into on-site low spots or loading into awaiting dump trucks for on-site transport to low spots.

2. As required by law, the Contractor shall notify Massachusetts Dig-Safe at least 72 hours prior to commencing soil excavation activities. The Contractor shall also identify and mark the locations of other subsurface utilities and/or structures that may not be identified through Dig-Safe prior to commencing excavation.

3. During excavation, existing asphalt, concrete or similar surface covering outside of the immediate excavation area, if present, and which is not required to be removed for the excavation, should be left in-place to the extent practicable to limit the generation of dust. Exposed soils shall be wetted as necessary to control dust.

4. Excavations that must be left opened overnight shall be secured by the Contractor using construction fencing and caution tape prior to leaving the Site for the day. Construction fence shall be supported at each end, and at every ten linear feet of length using appropriate means to prevent collapse. In addition, the perimeter chain link fence surrounding the Site shall be locked and secured prior to leaving the Site for the day.

7.2.1.4 On-Site Backfilling

1. Materials excavated on-site will be used to fill low spots.

2. Excavations shall be backfilled in two-foot (maximum) lifts. Each lift shall be compacted using the excavation equipment to provide a sound stable surface for backfilling subsequent lifts.

3. Before the addition of the 3' clean fill cap to the Site, a non-woven geotextile or construction safety fence material will cover the contaminated soil to provide a visual separation between the contaminated soil and imported clean fill.

7.2.2 Decontamination of Equipment

1. Tools and equipment that come into contact with Site soils shall be decontaminated by the Contractor prior to being removed from the property or prior to being use on the clean fill. This requirement is applicable to all tools, heavy machinery, and excavating and hauling equipment used during excavation, stockpiling, backfilling and off-Site transportation of material.

2. Soil shall not be tracked off Site at any time during the Project. Visible soil tracks on streets will not be allowed. The Contractor shall take sufficient precautions to prevent loose soils from adhering to tire treads, wheel wells, etc. Soil excavating/loading equipment and off-Site transportation vehicles shall be brushed clean of all loose soils prior to leaving work areas and soil stockpiling/loading areas. Loose soils removed from equipment and vehicles shall be cleaned-up immediately by the Contractor and consolidated with other stockpiled soils.

3. Any decontamination water generated during decontamination activities shall be collected by the Contractor using appropriate means and contained on-Site above ground storage containers. The Contractor shall provide adequate storage facilities to properly contain all decontamination water generated on-Site. Contaminated decontamination water shall be either treated on Site or disposed off-Site.

4. Only legally permitted disposal or recycling facilities may be used to accept the decontamination water generated from the Site. The disposal or recycling facility shall be established, fully operational, and licensed, as well as in compliance with all Federal, state and local regulations.

7.3 Health and Safety

A Health and Safety Plan (HASP) will be prepared to address environmental sampling activities and implementation of the remedial response actions at the Site.

7.3.1.1 Air Monitoring

1. On-Site air/dust monitoring will be conducted during earthwork activities to ensure the protection of on-Site workers and off-Site surrounding populations. Based on the nature of the contaminants present in the soil, air monitoring shall be performed for Dust/Particulates (PM_{10})

2. Air monitoring for dust/particulates shall be performed using a Thermo Electron Corporation MIE DR-4000 Data RAM, or equivalent.

3. Monitoring procedures will vary according to task and area of performance. As a general rule, the air monitoring should be performed within the breathing zone at the beginning of each activity and at each new work location. Baseline air measurements shall be conducted prior to the start of each workday. Ambient air background readings shall also be taken periodically from outside the work area in order to establish background readings for each of the above parameters.

4. The following actions level for dust/particulates shall apply during earthwork activities at this Site.

   Discontinue work and implement dust suppression measures if nuisance dust conditions exist or PM_{10} readings exceed **150** micrograms per cubic meter ($\mu g/m^3$) above background concentrations.

   Dust levels may be exceeded frequently during the course of the earthwork activities. The Contractor shall furnish and apply appropriate vapor and/or dust suppression measures at the direction of the LSP. Vapor and dust suppression options that are available include, covers over excavations, application of water for dust suppression and application of odor-suppressing foam for VOCs.

7.4 Permits

A Notice of Intent for soil management and construction activities within the resource oarea of Steven's Pond will be filed with the Lawrence Conservation Commission by the Site Civil Engineer, TEC. Because soil will be reused on-site, as a part of the selected remedy, response actions will be performed under a MCP Phase IV RIP. The required MCP Transmittal Froms are provided in Appendix G.

7.5 Operation, Maintenance and Monitoring

The chosen response action is to cap the site with three feet of clean fill. This response action does not required any operation, maintenance or monitoring.

7.6 Reporting

Following completion of park construction, the current AUL will be amended and a revised Class A-3 RAO will be prepared and submitted to MassDEP with a Phase IV Completion Statement.

REFERENCES

Brown and Caldwell, 2004. *Phase II Comprehensive Site Assessment, Former Lawrence Thermal Conversion Facility, Lawrence, Massachusetts, RTN 3-19158*, January 2004.

Brown and Caldwell, 2005. *Response Action Outcome Statement (RAO Class A-3), Former Lawrence Thermal Conversion Facility, Lawrence, Massachusetts, RTN 3-19158*, December 2005.

MADEP 2006. *Massachusetts Contingency Plan*. Massachusetts Department of Environmental Protection. April 2006.

Menzie-Cura & Associates, Inc., 2005. *MCP Method 3 Risk Characterization, Final Draft Report, Former Lawrence Thermal Conversion Facility, Lawrence, Massachusetts*, April 6, 2005.

TABLES

Table 5-1
REMEDIAL ALTERNATIVE 1
Excavation and Off-Site Disposal

COST ESTIMATE SUMMARY

DESCRIPTION	QTY	UNIT	UNIT COST	COST	TOTAL
1.0 Site Preparation and General Equipment					$81,100
1.1 Mobilization/Demobilization (Assume 10% of site work)	1	ls	$72,824.07	$72,824.07	
1.2 Clearing and grubbing	1	acre	$800.00	$800.00	
1.3 Temporary fencing and gates	100	lf	$8.31	$831.20	
1.4 Install erosion control measures	300	lf	$3.51	$1,052.92	
1.5 Dust monitoring	5	days	$1,100.00	$5,577.00	
2.0 Excavation and Disposal of Contaminated Soil and Sediment					$720,500
2.1 Excavate & load soil	4,056	cy	$2.55	$10,354.97	
2.2 Off-site transport and disposal of soil	6,084	ton	$100.00	$608,400.00	
2.3 Install geotextile cover	4,056	sy	$3.53	$14,330.65	
2.4 Disposal characterization analysis (every 500 cy)	13	ea	$790.00	$10,270.00	
2.5 Backfill soil excavation with clean fill	4,056	cy	$19.00	$77,064.00	
3.0 Site Cleanup and Restoration					$400
3.1 General site cleanup	1	acre	$360.00	$360.00	
4.0 Regulatory Compliance					$26,600
4.1 RAM Plan	1	ls	$5,600.00	$5,600.00	
4.2 Health and Saftey Plan	1	ls	$2,500.00	$2,500.00	
4.3 Soil Management Plan	1	ls	$2,500.00	$2,500.00	
4.4 Method 3 Risk Characterization	1	ls	$7,500.00	$7,500.00	
4.5 Activity and Use Limitation	1	ls	$4,000.00	$4,000.00	
4.6 Revised RAO/RAM Completion Report	1	ls	$4,500.00	$4,500.00	
5.0 Project Oversight					$91,200
5.1 Project Management			5%	$41,430.00	
5.2 Remediation Construction Management			6%	$49,716.00	
				Subtotal:	**$919,800**
Contingencies					$91,980
10% Scope Contingency			10%	$91,980.00	
				Total Estimated Cost:	**$1,011,800**

Table 5-2
REMEDIAL ALTERNATIVE 2
Pre-Characterization and Targeted Excavation and Off-Site Disposal of Select Soil

COST ESTIMATE SUMMARY

DESCRIPTION	QTY	UNIT	UNIT COST	COST	TOTAL
1.0 Soil Precharacterization					$21,100
1.1 Two day drilling with Direct Push rig	2	days	$2,950.00	$5,900.00	
1.2 Drilling oversight	2	days	$1,000.00	$2,000.00	
1.3 Soil sample analysis for arsenic and PAHs	50	ea	$113.25	$5,662.50	
1.4 Documentation of precharacterization	1	ls	$7,500.00	$7,500.00	
2.0 Site Preparation and General Equipment					$57,200
2.1 Mobilization/Demobilization (Assume 10% of site work)	1	ls	$50,777.54	$50,777.54	
2.2 Clearing and grubbing	1	acre	$800.00	$800.00	
2.3 Temporary fencing and gates	100	lf	$8.31	$831.20	
2.4 Install erosion control measures	300	lf	$3.51	$1,052.92	
2.5 Dust monitoring	3	days	$1,100.00	$3,718.00	
3.0 Excavation and Disposal of Contaminated Soil and Sediment					$501,900
3.1 Excavate & load soil (Assume 1/3 reduction in volume)	2,704	cy	$2.55	$6,903.31	
3.2 Confirmatory sample analysis	16	ea	$1,926.50	$30,824.00	
3.3 Off-site transport and disposal of soil	4,056	ton	$100.00	$405,600.00	
3.4 Disposal characterization analysis (every 500 cy)	9	ea	$790.00	$7,110.00	
3.5 Backfill soil excavation with clean fill	2,704	cy	$19.00	$51,376.00	
4.0 Site Cleanup and Restoration					$400
4.1 General site cleanup	1	acre	$360.00	$360.00	
5.0 Regulatory Compliance					$26,600
5.1 RAM Plan	1	ls	$5,600.00	$5,600.00	
5.2 Health and Saftey Plan	1	ls	$2,500.00	$2,500.00	
5.3 Soil Management Plan	1	ls	$2,500.00	$2,500.00	
5.4 Method 3 Risk Characterization	1	ls	$7,500.00	$7,500.00	
5.5 Activity and Use Limitation	1	ls	$4,000.00	$4,000.00	
5.6 Revised RAO/RAM Completion Report	1	ls	$4,500.00	$4,500.00	
6.0 Project Oversight					$66,800
6.1 Project Management			5%	$30,360.00	
6.2 Remediation Construction Management			6%	$36,432.00	
				Subtotal:	**$674,000**
Contingencies					$67,400
10% Scope Contingency			10%	$67,400.00	
				Total Estimated Cost:	**$741,400**

Table 5-3
REMEDIAL ALTERNATIVE 3
Capping In Place

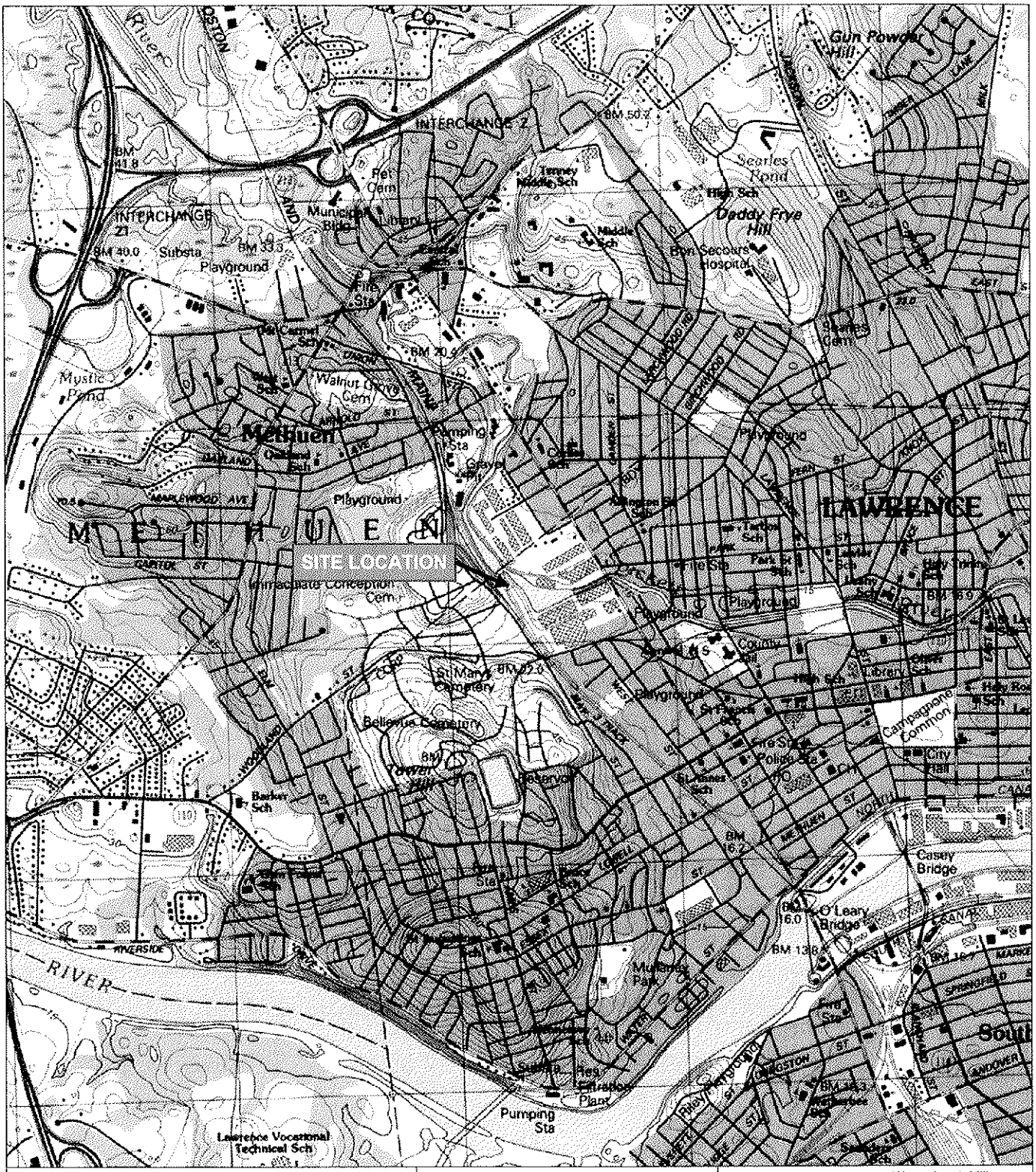
COST ESTIMATE SUMMARY

DESCRIPTION	QTY	UNIT	UNIT COST	COST	TOTAL
1.0 Site Preparation and General Equipment					$14,300
1.1 Mobilization/Demobilization (Assume 10% of site work)	1	ls	$11,579.97	$11,579.97	
1.2 Clearing and grubbing	1	acre	$800.00	$800.00	
1.3 Temporary fencing and gates	100	lf	$8.31	$831.20	
1.4 Install erosion control measures	300	lf	$3.51	$1,052.92	
2.0 Excavation and Disposal of Contaminated Soil and Sediment					$113,600
2.1 Install geotextile cover	4,056	sy	$4.00	$16,222.22	
2.2 Provide 3 feet of clean fill	4,056	cy	$24.00	$97,333.33	
3.0 Site Cleanup and Restoration					$400
3.1 General site cleanup	1	acre	$360.00	$360.00	
4.0 Regulatory Compliance					$32,500
4.1 RAM Plan	1	ls	$6,000.00	$6,000.00	
4.2 Phase III Feasibility Evaluation of Alternatives to Capping	1	ls	$2,500.00	$2,500.00	
4.3 Health and Saftey Plan	1	ls	$3,000.00	$3,000.00	
4.4 Soil Management Plan	1	ls	$3,000.00	$3,000.00	
4.5 Method 3 Risk Characterization	1	ls	$8,000.00	$8,000.00	
4.6 Activity and Use Limitation	1	ls	$5,000.00	$5,000.00	
4.7 Revised RAO/RAM Completion Report	1	ls	$5,000.00	$5,000.00	
5.0 Project Oversight					$17,700
Project Management			5%	$8,040.00	
Remediation Construction Management			6%	$9,648.00	
				Subtotal:	**$178,500**
Contingencies					$17,850
10% Scope Contingency			10%	$17,850.00	
				Total Estimated Cost:	**$196,400**

Table 5-4
Comparison of Remedial Alternatives
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

	Remedial Alternative	Advantages	Disadvantages
1	**Excavation and Off-Site Disposal**	• Impacted soil is removed from Site • Eliminates exposure to impacted soil • No limitations to future grading of the Site	• Highest cost alternative • Involves most construction vehicle traffic of all alternatives
2	**Pre-Characterization and Targeted Excavation and Off-Site Disposal of Select Soil**	• Minimizes volume of impacted soil to be removed from Site	• Pre-characterization assessment may not result in decrease of excavation volume • Pre-characterization sampling plan requires approval of Site owner • The presence of COCs below background levels may result in incremental Site risk
3	**Capping in Place**	• Lowest cost alternative • Eliminates exposure to impacted soil • Easiest alternative to implement • Potentially least amount of construction vehicle traffic	• Impacted soil remains on site • Future development will require a 3-foot grade increase • Soil cap must be maintained • Requires alternatives analysis under RAM prior to construction

FIGURES



Base map is portion of 7.5 Minute Lawrence USGS Topographic Quadrangle.

0 1,000 2,000 3,000 Feet

N

MASSACHUSETTS

QUADRANGLE LOCATION

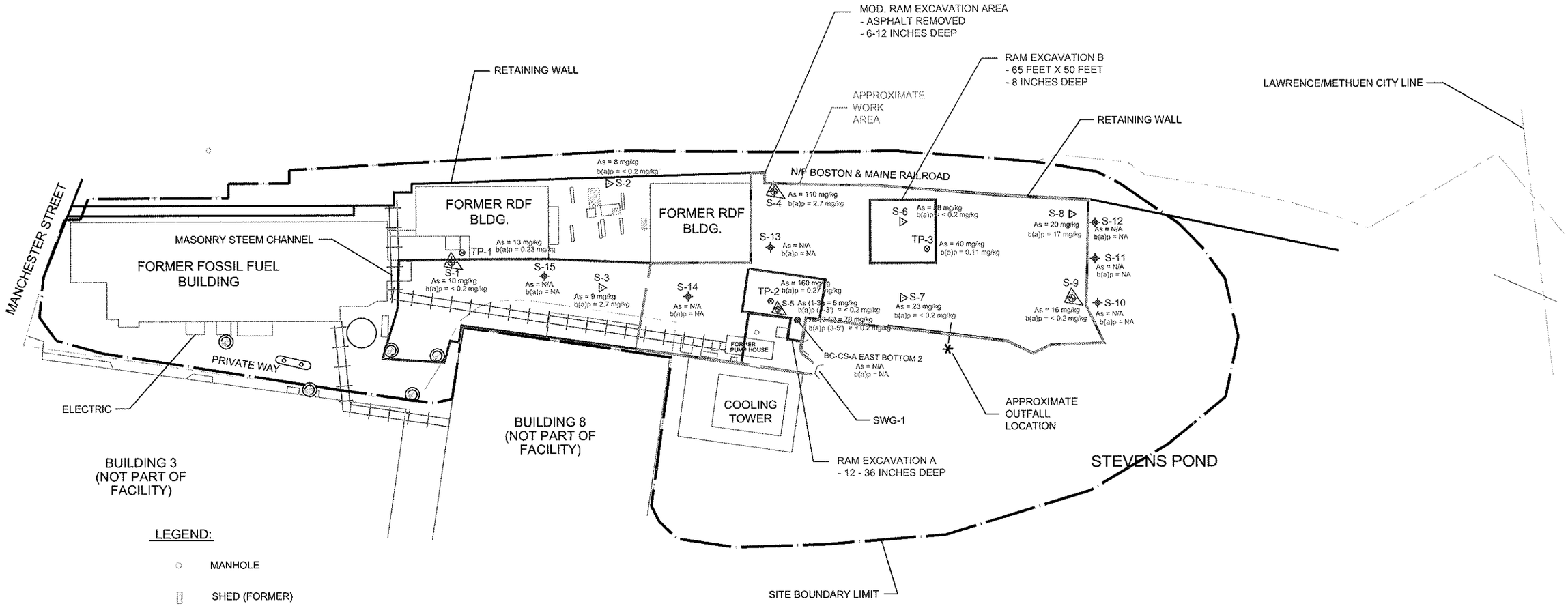
TRC
Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
978-970-5600

SITE LOCATION

FORMER LAWRENCE THERMAL CONVERSION FACILITY

LAWRENCE, MASSACHUSETTS

FIGURE 1-1	OCTOBER 2008


MOD. RAM EXCAVATION AREA
- ASPHALT REMOVED
- 6-12 INCHES DEEP
RAM EXCAVATION B
- 65 FEET X 50 FEET
- 8 INCHES DEEP
APPROXIMATE WORK AREA
RETAINING WALL
LAWRENCE/METHUEN CITY LINE
RETAINING WALL
N/F BOSTON & MAINE RAILROAD
MANCHESTER STREET
MASONRY STEEM CHANNEL
FORMER FOSSIL FUEL BUILDING
FORMER RDF BLDG.
FORMER RDF BLDG.
As = 8 mg/kg
b(a)p = < 0.2 mg/kg
S-2
S-4 As = 110 mg/kg b(a)p = 2.7 mg/kg
S-6 As = 8 mg/kg b(a)p = < 0.2 mg/kg
TP-3 As = 40 mg/kg b(a)p = 0.11 mg/kg
S-8 As = 20 mg/kg b(a)p = 17 mg/kg
S-12 As = N/A b(a)p = NA
S-11 As = N/A b(a)p = NA
S-9 As = 16 mg/kg b(a)p = < 0.2 mg/kg
S-10 As = N/A b(a)p = NA
S-13 As = N/A b(a)p = NA
TP-1 As = 13 mg/kg b(a)p = 0.23 mg/kg
S-1 As = 10 mg/kg b(a)p = < 0.2 mg/kg
S-15 As = N/A b(a)p = NA
S-3 As = 9 mg/kg b(a)p = 2.7 mg/kg
S-14 As = N/A b(a)p = NA
TP-2 As = 160 mg/kg b(a)p = 0.27 mg/kg
S-5 As (1-3') = 6 mg/kg b(a)p (1-3') = < 0.2 mg/kg
As (3-5') = 78 mg/kg b(a)p (3-5') = < 0.2 mg/kg
S-7 As = 23 mg/kg b(a)p = < 0.2 mg/kg
FORMER PUMP HOUSE
BC-CS-A EAST BOTTOM 2 As = N/A b(a)p = NA
PRIVATE WAY
ELECTRIC
COOLING TOWER
SWG-1
APPROXIMATE OUTFALL LOCATION
BUILDING 8 (NOT PART OF FACILITY)
RAM EXCAVATION A
- 12 - 36 INCHES DEEP
STEVENS POND
BUILDING 3 (NOT PART OF FACILITY)
SITE BOUNDARY LIMIT

LEGEND:

- MANHOLE
- SHED (FORMER)
- HEADWALL
- OLD MONITORING WELL
- SOIL SAMPLE
- SOIL BORING LOCATION
- CONFIRMATORY SOIL SAMPLE LOCATION
- SOIL BORING, FINISHED AS MONITORING WELL
- TEST PIT

80 0 80 160
scale feet

Adapted from original plan by Brown and Caldwell, Figure 2, Site Plan, Lawrence Thermal Conversion Facility, Lawrence, Essex County, Massachusetts.

LAWRENCE THERMAL CONVERSION FACILITY
LAWRENCE, MASSACHUSETTS

SITE PLAN
PROJECT 160423.0000.0000

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
(978) 970-5600

DRAWN BY: MAN
CHECKED BY: MC
DATE: JUNE 21 2006

FIGURE 1-2

APPENDIX A

ANALYTICAL DATA SUMMARY

Appendix A-1
Analytical Data for Fish-Fillet
Former Lawerence Thermal Conversion Facility
Lawrence, Massachusetts

Sample ID Sample Type Sample Date	111904-1 Y. Bullhead 11/19/04		111904-2 C.Carp 11/19/04		111904-3 Pickeral 11/19/04		111904-4,5,6,7 Y. perch 11/19/04		11904-8 C. Carp 11/19/04	
Metals (mg/kg wet weight)										
Arsenic	0.012		0.09		0.057		0.081		0.11	
Cadmium	0.011	U	0.011	U	0.0099	U	0.011	U	0.0095	U
Chromium	0.22		0.43		0.23		0.38		0.27	
Lead	0.35		0.016		0.026		0.12		0.011	
Mercury	0.52		0.09		0.52		0.19		0.031	
Vanadium	0.053	U	0.053	U	0.049	U	0.056	U	0.048	U
Dioxins and Furans (pg/g wet weight)										
2,3,7,8-TCDD	0.2	U	0.59		0.09	U	0.18	J	0.1	U
1,2,3,7,8-PeCDD	0.45	J	1.2	J	0.2	U	0.04	U	0.36	J
1,2,3,4,7,8-HxCDD	0.12	J	0.61	J	0.06	U	0.03	U	0.2	U
1,2,3,6,7,8-HxCDD	0.32	J	1.3	J	0.07	U	0.24	J	0.31	J
1,2,3,7,8,9-HxCDD	0.08	U	2.7	J	0.06	U	0.03	U	0.09	U
1,2,3,4,6,7,8-HpCDD	0.49	J	2.4	J	0.1	U	0.51	J	0.43	J
1,2,3,4,6,7,8,9-OCDD	0.82	J	2	J	0.2	U	0.8	U	0.7	U
2,3,7,8-TCDF	0.08	U	0.75	U	0.34	J	0.29	J	0.07	U
1,2,3,7,8-PeCDF	0.07	U	0.1		0.05	U	0.03	U	0.08	U
2,3,4,7,8-PeCDF	1.3	J	1.3	J	0.15	J	0.22	J	0.28	J
1,2,3,4,7,8-HxCDF	0.7	U	1.7	J	0.27	J	0.78	J	0.63	J
1,2,3,6,7,8-HxCDF	0.06	U	1.2	J	0.05	U	0.3	U	0.07	U
2,3,4,6,7,8-HxCDF	0.09	U	0.82	J	0.05	U	0.03	U	0.07	U
1,2,3,7,8,9-HxCDF	0.1	U	2.5	J	0.07	U	0.04	U	0.98	J
1,2,3,4,6,7,8-HpCDF	0.09	U	0.53	J	0.07	U	0.16	J	1	U
1,2,3,4,7,8,9-HpCDF	0.1	U	0.2	U	0.1	U	0.06	U	0.1	U
1,2,3,4,6,7,8,9-OCDF	0.2	U	0.3	U	0.1	U	0.08	U	0.2	U
TEQ	1.15	J	3.56	J	0.14	J	0.43	J	0.70	J

Notes:
U = not detected at this concentration
J = estimated concentration

Appendix A-2
Summary of Analytical Results for On-Site Soil
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample I.D.	S-1		CL-SS1-TP1		CL-SS2-TP1		CL-SS3-TP1		S-2		S-2 DUP	S-2 AVG		S-3		S-4		S-4		S4-DUP		S-4 AVG	
Depth	1-3'		2'-3'		3'-5'		6'		1-3'		1-3'	1-3'		1-3'		1-3'		3-5'		3-5'		3-5'		
Date Sampled	10/26/2000		1/3/2002		1/3/2002		1/3/2002		10/26/2000		10/26/2000	10/26/2000		10/26/2000		10/26/2000		10/26/2000		10/26/2000		10/26/2000	
Metals (mg/kg)																								
Arsenic, Total	10		13		8.5		9.1		8		NA	8		9		110		55		34		45		
Barium, Total	22		32		36		44		25		NA	25		20		96		47		42		45		
Cadmium, Total	1.3		1.8		0.4	U	0.5	U	0.2	U	NA	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	
Chromium, Total	13		15		18		20		14		NA	14		13		13		39		34		37		
Copper, Total	NA		21		23.0		14.0		NA		NA	NA		NA		NA		NA		NA		NA		
Iron, Total	NA		10000		9400		9500		NA		NA	NA		NA		NA		NA		NA		NA		
Lead, Total	17		24		29		220		34		NA	34		68		68		14		12		13		
Magnesium, Total	NA		2400		2600		2900		NA		NA	NA		NA		NA		NA		NA		NA		
Manganese, Total	NA		110		130		120		NA		NA	NA		NA		NA		NA		NA		NA		
Mercury, Total	0.2	U	NA		NA		NA		0.2	U	NA	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	
Nickel, Total	NA		15		19		13		NA		NA	NA		NA		NA		NA		NA		NA		
Selenium, Total	2	U	NA		NA		NA		2	U	NA	2	U	2	U	2	U	2	U	2	U	2	U	
Silver, Total	0.2	U	NA		NA		NA		0.2	U	NA	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	
Vanadium, Total	NA		50		99		22		NA		NA	NA		NA		NA		NA		NA		NA		
Zinc, Total	NA		70		30		49		NA		NA	NA		NA		NA		NA		NA		NA		
PAHs(mg/kg)																								
1-Methylnapthalene	NA		0.08		0.11		0.06	U	NA		NA	NA		NA		NA		NA		NA		NA		
2-Methylnapthalene	0.20	U	0.07		0.07		0.06	U	0.20	U	NA	0.20	U	0.20	U	0.2	U	0.2	U	0.2	U	0.2	U	
2-Chloronapthalene	NA		NA		NA		NA		NA		NA	NA		NA		NA		NA		NA		NA		
Acenapthene	0.20	U	0.05	U	0.07		0.20		0.20	U	NA	0.20	U	0.20	U	0.2	U	0.2	U	0.2	U	0.2	U	
Acenapthylene	0.20	U	0.05	U	0.06	U	0.06	U	0.20	U	NA	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.2	U	
Anthracene	0.20	U	0.14		0.16		0.34		0.20	U	NA	0.20	U	0.20	U	0.2	U	0.2	U	0.2	U	0.2	U	
Benzo(a)anthracene	0.20	U	0.32		0.26		0.66		0.20	U	NA	0.20	U	2.1		0.2	U	0.2	U	0.2	U	0.2	U	
Benzo(a)pyrene	0.20	U	0.34		0.23		0.64		0.20	U	NA	0.20	U	2.70		3		0.2	U	0.2	U	0.2	U	
Benzo(b)fluoranthene	0.20	U	0.40		0.26		0.80		0.20	U	NA	0.20	U	3.00		0.2	U	0.2	U	0.2	U	0.2	U	
Benzo(e)pyrene	NA		0.29		0.19		0.42		NA		NA	NA		NA		NA		NA		NA		NA		
Benzo(g,h,i)perylene	0.20	U	0.22		0.14		0.36		0.20	U	NA	0.20	U	2.10		2.2		0.2	U	0.2	U	0.2	U	
Benzo(k)fluoranthene	0.20	U	0.14		0.10		0.30		0.20	U	NA	0.20	U	2.10		0.2	U	0.2	U	0.2	U	0.2	U	
Biphenyl	NA		0.05	U	0.06	U	0.06	U	NA		NA	NA		NA		NA		NA		NA		NA		
Chrysene	0.20	U	0.37		0.27		0.64		0.20	U	NA	0.20	U	3.00		1.1		0.2	U	0.2	U	0.2	U	
Dibenz(a,h)anthracene	0.20	U	0.07		0.06	U	0.10		0.20	U	NA	0.20	U	0.40		0.2	U	0.2	U	0.2	U	0.2	U	
Fluoranthene	0.20	U	0.73		0.73		1.7		0.20	U	NA	0.20	U	3.8		0.2	U	0.2	U	0.2	U	0.2	U	
Fluorene	0.20	U	0.05	U	0.09		0.18		0.20	U	NA	0.20	U	0.20	U	0.2	U	0.2	U	0.2	U	0.2	U	
Indeno(1,2,3-c,d)pyrene	0.20	U	0.21		0.13		0.42		0.20	U	NA	0.20	U	1.60		0.2	U	0.2	U	0.2	U	0.2	U	
Naphthalene	0.20	U	0.05	U	0.06	U	0.06		0.20	U	NA	0.20	U	0.20	U	0.2	U	0.2	U	0.2	U	0.2	U	
Perylene	NA		0.08		0.06		0.21		NA		NA	NA		NA		NA		NA		NA		NA		
Phenanthrene	0.20	U	0.59		0.74		1.0		0.20	U	NA	0.20	U	1.1		0.2	U	0.2	U	0.2	U	0.2	U	
Pyrene	0.20	U	0.74		0.66		1.3		0.20	U	NA	0.20	U	3.2		0.2	U	0.2	U	0.2	U	0.2	U	
Other SVOCs (mg/kg)																								
Benzothiophene	NA		0.05	U	0.06	U	0.06	U	NA		NA	NA		NA		NA		NA		NA		NA		
Dibenzofuran	NA		0.09		0.06		0.17		NA		NA	NA		NA		NA		NA		NA		NA		
Dibenzothiophene	NA		0.06		0.15		0.13		NA		NA	NA		NA		NA		NA		NA		NA		

Appendix A-2
Summary of Analytical Results for On-Site Soil
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample I.D.	S-1		CL-SS1-TP1		CL-SS2-TP1		CL-SS3-TP1		S-2		S-2 DUP		S-2 AVG		S-3		S-4	S-4	S4-DUP	S-4 AVG
Depth	1-3'		2'-3'		3'-5'		6'		1-3'		1-3'		1-3'		1-3'		1-3'	3-5'	3-5'	3-5'
Date Sampled	10/26/2000		1/3/2002		1/3/2002		1/3/2002		10/26/2000		10/26/2000		10/26/2000		10/26/2000		10/26/2000	10/26/2000	10/26/2000	10/26/2000
Dioxins and Furans (pg/g)																				
2,3,7,8-TCDD	0.3	U	0.81		0.4	U	0.72	J	0.13	U	0.20	U	0.13	U	1.75		NA	NA	NA	NA
1,2,3,7,8-PeCDD	0.672	U	3.9		0.8	U	1.3	J	0.3	U	0.4		0.4		8.5		NA	NA	NA	NA
1,2,3,4,7,8-HxCDD	0.295	U	4.5		1.1	U	0.8	U	0.2	U	0.3		0.3		6.42		NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	0.352		7.1		1.1	U	1.0	J	0.4		0.6		0.5		8.81		NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	0.309		11.0		1.1	U	1.1	J	0.2	U	0.5		0.5		9.28		NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	3.54		58.2		5.5		2.2	J	3.1		4.3		3.7		50.9		NA	NA	NA	NA
1,2,3,4,6,7,8,9-OCDD	22.6		132		31.3		8.1	J	17		22		19		122		NA	NA	NA	NA
2,3,7,8-TCDF	0.232	U	0.97		1.0	U	5.3		0.3	U	0.3		0.3		1.85		NA	NA	NA	NA
1,2,3,7,8-PeCDF	0.29	U	2.3	J	0.5	U	4.2	J	0.3	U	0.4		0.4		5.87		NA	NA	NA	NA
2,3,4,7,8-PeCDF	0.364		3.2	J	0.5	U	5.8		0.3		0.5		0.4		5.25		NA	NA	NA	NA
1,2,3,4,7,8-HxCDF	0.350		9.6		0.7	U	7.0		0.5		0.7		0.6		9.01		NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	0.272		4.7		0.7	U	3.0	J	0.3		0.6		0.5		9.04		NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	0.346		5.0		0.7	U	2.7	J	0.3		0.5		0.4		5.30		NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	0.103	U	0.53	J	0.9	U	0.7	U	0.11	U	0.11	U	0.11	U	1.10		NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDF	1.62		26.7		1.7	U	5.2		1.5		2.3		1.9		35.9		NA	NA	NA	NA
1,2,3,4,7,8,9-HpCDF	0.181	U	1.8	J	2.1	U	1.7	U	0.1	U	0.2	U	0.1	U	1.78		NA	NA	NA	NA
1,2,3,4,6,7,8,9-OCDF	3.43		9.7		6.1	U	4.1	U	1.35		1.80		1.58		11.3		NA	NA	NA	NA
TEQ	0.40	J	11.65	J	0.06	J	7.21	J	0.37	J	1.11	J	1.01	J	19.15	J	NA	NA	NA	NA

Notes:
U = not detected at this concentration
J = estimated concentration

Appendix A-2
Summary of Analytical Results for On-Site Soil
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample I.D.	S-5		S-5		CL-SS2-TP2		CL-SS3-TP2		S-6		CL-SS1-TP3		CL-SS2-TP3		CL-SS3-TP3		S-7	
Depth	1-3'		3-5'		1.5'-3'		5'		1.5-4'		3.7'-4'		2'-3.7'		4'-5.5'		1-3'	
Date Sampled	10/26/2000		10/26/2000		1/7/2002		1/7/2002		10/26/2000		1/7/2002		1/7/2002		1/7/2002		10/26/2000	
Metals (mg/kg)																		
Arsenic, Total	6		78		160		78		58		7		40		34		23	
Barium, Total	91		150		150		30		48		36		38		41		37	
Cadmium, Total	0.2	U	0.20	U	0.59		0	U	0.2	U	0.5	U	0.5	U	0.6	U	0.2	U
Chromium, Total	1.1		1.1		18.0		8		11		13		13		5.6		24	
Copper, Total	NA		NA		990		56		NA		22.0		17.0		140		NA	
Iron, Total	NA		NA		36000		22000		NA		25000		14000		19000		NA	
Lead, Total	28		53		220		59		14		89		16		38		12	
Magnesium, Total	NA		NA		520		840		NA		2100		2000		88		NA	
Manganese, Total	NA		NA		140		30		NA		240		51.0		17		NA	
Mercury, Total	0.2	U	0.2	U	NA		NA		0.2	U	NA		NA		NA		0.2	U
Nickel, Total	NA		NA		21.0		4		NA		11.0		8.4		6.8		NA	
Selenium, Total	2	U	2	U	NA		NA		2	U	NA		NA		NA		2	U
Silver, Total	0.2	U	0.2	U	NA		NA		0.2	U	NA		NA		NA		0.2	U
Vanadium, Total	NA		NA		34		8		NA		14		13		17		NA	
Zinc, Total	NA		NA		180		11		NA		81		13		10		NA	
PAHs(mg/kg)																		
1-Methylnapthalene	NA		NA		0.016		0.01	U	NA		0.018		0.014		0.01	U	NA	
2-Methylnapthalene	0.2	U	0.2	U	0.017		0.008		0.2	U	0.022		0.019		0.01	U	0.2	U
2-Chloronapthalene	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Acenapthene	0.2	U	0.2	U	0.047		0.01	U	0.2	U	0.012		0.016		0.01	U	0.2	U
Acenapthylene	0.20	U	0.20	U	0.014		0.01	U	0.20	U	0.008		0.01	U	0.01	U	0.2	U
Anthracene	0.2	U	0.2	U	0.17		0.01	U	0.2	U	0.037		0.054		0.01	U	0.2	U
Benzo(a)anthracene	0.2	U	0.2	U	0.30		0.014		0.2	U	0.11		0.11		0.011		0.2	U
Benzo(a)pyrene	0.2	U	0.2	U	0.27		0.015		0.2	U	0.087		0.11		0.014		0.2	U
Benzo(b)fluoranthene	0.2	U	0.2	U	0.33		0.024		0.2	U	0.15		0.15		0.017		0.2	U
Benzo(e)pyrene	NA		NA		0.17		0.021		NA		0.11		0.086		0.010		NA	
Benzo(g,h,i)perylene	0.2	U	0.2	U	0.13		0.013		0.2	U	0.072		0.069		0.009		0.2	U
Benzo(k)fluoranthene	0.2	U	0.2	U	0.12		0.01	U	0.2	U	0.052		0.045		0.007		0.2	U
Biphenyl	NA		NA		0.01	U	0.01	U	NA		0.007		0.007		0.01	U	NA	
Chrysene	0.2	U	0.8		0.28		0.033		0.2	U	0.17		0.12		0.013		0.2	U
Dibenz(a,h)anthracene	0.2	U	0.2	U	0.049		0.01	U	0.2	U	0.026		0.020		0.01	U	0.2	U
Fluoranthene	0.2	U	0.8		0.64		0.020		0.2	U	0.22		0.24		0.026		0.2	U
Fluorene	0.2	U	0.2	U	0.050		0.01	U	0.2	U	0.017		0.019		0.01	U	0.2	U
Indeno(1,2,3-c,d)pyrene	0.2	U	0.2	U	0.16		0.011		0.2	U	0.067		0.073		0.010		0.2	U
Naphthalene	0.2	U	0.2	U	0.019		0.01	U	0.2	U	0.024		0.017		0.01	U	0.2	U
Perylene	NA		NA		0.066		0.01	U	NA		0.021		0.030		0.01	U	NA	
Phenanthrene	0.2	U	0.2	U	0.58		0.028		0.2	U	0.19		0.18		0.011		0.2	U
Pyrene	0.2	U	0.6		0.52		0.017		0.2		0.21		0.19		0.022		0.2	U
Other SVOCs (mg/kg)																		
Benzothiophene	NA		NA		0.01	U	0.01	U	NA		0.01	U	0.01	U	0.01	U	NA	
Dibenzofuran	NA		NA		0.032		0.01	U	NA		0.010		0.028		0.01	U	NA	
Dibenzothiophene	NA		NA		0.032		0.01	U	NA		0.015		0.014		0.01	U	NA	

Appendix A-2
Summary of Analytical Results for On-Site Soil
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample I.D.	S-5		S-5		CL-SS2-TP2		CL-SS3-TP2		S-6		CL-SS1-TP3		CL-SS2-TP3		CL-SS3-TP3		S-7	
Depth	1-3'		3-5'		1.5'-3'		5'		1.5-4'		3.7'-4'		2'-3.7'		4'-5.5'		1-3'	
Date Sampled	10/26/2000		10/26/2000		1/7/2002		1/7/2002		10/26/2000		1/7/2002		1/7/2002		1/7/2002		10/26/2000	
Dioxins and Furans (pg/g)																		
2,3,7,8-TCDD	1.13		6.47		0.74		0.22	J	0.301	U	0.1	U	0.1	U	0.1	U	NA	
1,2,3,7,8-PeCDD	5.68		31.1		3.1	J	0.46	J	0.381		0.2	U	0.29 J	J	0.1	U	NA	
1,2,3,4,7,8-HxCDD	4.35		34.4		2.7	J	0.42	J	0.376		0.2	U	0.31 J	J	0.1	U	NA	
1,2,3,6,7,8-HxCDD	11.4		42.2		4.9		0.49	J	0.579		0.2	U	0.43 J	J	0.1	U	NA	
1,2,3,7,8,9-HxCDD	7.82		46.9		6.3		0.92	J	0.477		0.2	U	0.70 J	J	0.1	U	NA	
1,2,3,4,6,7,8-HpCDD	37.3		302		21.7		2.6	J	6.51		0.3	U	3.1		0.2	U	NA	
1,2,3,4,6,7,8,9-OCDD	37.7		533		26.2		4.2	J	29.0		0.4	J	9.0		0.4	J	NA	
2,3,7,8-TCDF	2.68		7.06		1.6		0.82		0.435		0.38 J	J	0.6	J	0.1	J	NA	
1,2,3,7,8-PeCDF	4.43		20.3		1.9	J	0.6	J	0.338		0.1	U	0.3	J	0.1	U	NA	
2,3,4,7,8-PeCDF	2.96		21.4		2.3	J	0.5	J	0.413		0.1	U	0.27	J	0.1	U	NA	
1,2,3,4,7,8-HxCDF	4.93		36.7		4.7	J	1.1	J	0.522		0.1	U	0.86	J	0.1	U	NA	
1,2,3,6,7,8-HxCDF	3.43		35.9		2.4	J	0.62	J	0.447		0.2	U	0.39	J	0.1	U	NA	
2,3,4,6,7,8-HxCDF	1.83		25.2		1.7	J	0.45	J	0.666		0.1	U	0.52	J	0.1	U	NA	
1,2,3,7,8,9-HxCDF	0.684		5.28		0.1	U	0.27	J	0.104	U	0.2	U	0.1	U	0.1	U	NA	
1,2,3,4,6,7,8-HpCDF	11.0		162		9.4		2.0	J	3.59		0.3	U	2.4	J	0.2	U	NA	
1,2,3,4,7,8,9-HpCDF	0.988		9.11		0.70	J	0.3	U	0.317	U	0.3	U	0.3	U	0.2	U	NA	
1,2,3,4,6,7,8,9-OCDF	4.81		54.1		2.4	J	1.0	J	7.30		0.4	U	0.1	J	0.2	U	NA	
TEQ	12.72	J	77.44	J	7.84	J	1.50	J	1.06	J	0.04	J	0.87	J	0.01	J	NA	

Notes:
U = not detected at this concentration
J = estimated concentration

Appendix A-2
Summary of Analytical Results for On-Site Soil
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample I.D.	S-8		S-9		S-10	S-11	S-12	S-13	S-14	S-15	BC-CS-A East Bottom		BC-CS-A East Bottom DUP		BC-CS-A East Bottom AVG	BC-CS-A East Bottom 2
Depth	1-3'		1-3'		0.5'	0.5'	0.5'	2'	2'	2'	2'		2'		2'	3'
Date Sampled	10/26/2000		10/26/2000		1/4	1/4	1/4	1/4/2005	1/4/2005	1/4	1/6/04		1/6/04		1/6/04	3/21/05
Metals (mg/kg)																
Arsenic, Total	20		16		NA	NA	NA	NA	NA	NA	12		12		12	NA
Barium, Total	17		47		NA	NA	NA	NA	NA	NA	50		62		56	NA
Cadmium, Total	0.2	U	0.2	U	NA	NA	NA	NA	NA	NA	7.7		8.5		8.1	NA
Chromium, Total	9.9		13		NA	NA	NA	NA	NA	NA	25		24		24.5	NA
Copper, Total	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
Iron, Total	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
Lead, Total	6		21		NA	NA	NA	NA	NA	NA	390		460		425	NA
Magnesium, Total	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
Manganese, Total	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
Mercury, Total	0.2	U	0.2	U	NA	NA	NA	NA	NA	NA	0.39		0.35		0.37	NA
Nickel, Total	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
Selenium, Total	2	U	2	U	NA	NA	NA	NA	NA	NA	2.3	U	2.4	U	2.3	U	NA
Silver, Total	0.2	U	0.2	U	NA	NA	NA	NA	NA	NA	1.8		2		1.9	NA
Vanadium, Total	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
Zinc, Total	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
PAHs(mg/kg)																
1-Methylnapthalene	NA		NA		NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
2-Methylnapthalene	3.1		0.2	U	NA	NA	NA	NA	NA	NA	0.94	U	0.95	U	0.94	U	NA
2-Chloronapthalene	NA		NA		NA	NA	NA	NA	NA	NA	0.7	U	0.71	U	0.7	U	NA
Acenapthene	3.4		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Acenapthylene	1.6		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Anthracene	8.2		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Benzo(a)anthracene	19		0.2	U	NA	NA	NA	NA	NA	NA	0.59		0.6	U	0.59		NA
Benzo(a)pyrene	17		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Benzo(b)fluoranthene	19		0.2	U	NA	NA	NA	NA	NA	NA	0.6		0.6		0.6		NA
Benzo(e)pyrene	NA		NA		NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Benzo(g,h,i)perylene	10		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Benzo(k)fluoranthene	11		0.2	U	NA	NA	NA	NA	NA	NA	0.62		0.6	U	0.62		NA
Biphenyl	NA		NA		NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.559	U	NA
Chrysene	22		0.6		NA	NA	NA	NA	NA	NA	0.7		0.66		0.68		NA
Dibenz(a,h)anthracene	3		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Fluoranthene	57		0.6		NA	NA	NA	NA	NA	NA	0.59	U	1		1		NA
Fluorene	6.2		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Indeno(1,2,3-c,d)pyrene	9.3		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Naphthalene	9.1		0.2	U	NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Perylene	NA		NA		NA	NA	NA	NA	NA	NA	0.59	U	0.6	U	0.59	U	NA
Phenanthrene	56		0.7		NA	NA	NA	NA	NA	NA	0.82		0.64		0.73		NA
Pyrene	39		0.7		NA	NA	NA	NA	NA	NA	1		0.99		0.995		NA
Other SVOCs (mg/kg)																
Benzothiophene	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
Dibenzofuran	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA
Dibenzothiophene	NA		NA		NA	NA	NA	NA	NA	NA	NA		NA		NA	NA

Appendix A-2
Summary of Analytical Results for On-Site Soil
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample I.D.	S-8		S-9		S-10		S-11		S-12		S-13		S-14		S-15		BC-CS-A East Bottom		BC-CS-A East Bottom DUP		BC-CS-A East Bottom AVG		BC-CS-A East Bottom 2	
Depth	1-3'		1-3'		0.5'		0.5'		0.5'		2'		2'		2'		2'		2'		2'		3'	
Date Sampled	10/26/2000		10/26/2000		1/4		1/4		1/4		1/4/2005		1/4/2005		1/4		1/6/04		1/6/04		1/6/04		3/21/05	
Dioxins and Furans (pg/g)																								
2,3,7,8-TCDD	0.269	U	NA		0.61	J	3.7		2.3		0.1	U	0.1	U	0.09	U	NA		NA		NA		0.18	J
1,2,3,7,8-PeCDD	0.355	U	NA		2.7	J	16		6.6	J	0.23	J	0.1	U	0.49	J	NA		NA		NA		0.32	J
1,2,3,4,7,8-HxCDD	0.305	U	NA		3.4	J	18.8		7.5	J	0.2	U	0.2	U	0.1	U	NA		NA		NA		0.38	J
1,2,3,6,7,8-HxCDD	0.335	U	NA		4.4	J	22.9		9	J	0.1	U	0.2	U	0.69	J	NA		NA		NA		0.77	J
1,2,3,7,8,9-HxCDD	0.295	U	NA		7.8	J	43.1		16.1		0.1	U	0.1	U	0.69	J	NA		NA		NA		0.76	J
1,2,3,4,6,7,8-HpCDD	1.22		NA		39.4		230		73.9		0.3	U	0.3	U	2.7	J	NA		NA		NA		10.5	
1,2,3,4,6,7,8,9-OCDD	3.03		NA		106		877		171		1.6	J	2.6	J	4	J	NA		NA		NA		63.1	
2,3,7,8-TCDF	0.362	U	NA		0.64	J	2.6	J	27.7	J	0.08	U	0.10	U	1	J	NA		NA		NA		1	U
1,2,3,7,8-PeCDF	0.401	U	NA		2	J	10.6	J	20.4		0.54	J	0.09	U	0.52	J	NA		NA		NA		0.47	J
2,3,4,7,8-PeCDF	0.404	U	NA		2.1	J	11	J	35.7		0.40	J	0.09	U	0.71	J	NA		NA		NA		1.8	J
1,2,3,4,7,8-HxCDF	0.333	U	NA		7.9	J	41.8		85.4		0.44	J	0.1	U	1.3	J	NA		NA		NA		1.6	J
1,2,3,6,7,8-HxCDF	0.33	U	NA		4.2	J	22.6		34.9		0.34	J	0.1	U	0.47	J	NA		NA		NA		1.6	J
2,3,4,6,7,8-HxCDF	0.329	U	NA		3	J	13.8		33.5		0.30	J	0.09	U	0.49	J	NA		NA		NA		2.7	J
1,2,3,7,8,9-HxCDF	0.0691	U	NA		0.67	J	2.4	J	2.6	J	0.1	U	0.1	U	0.1	U	NA		NA		NA		0.97	J
1,2,3,4,6,7,8-HpCDF	0.675		NA		24.2		125		127		0.61	J	0.2	U	1.6	J	NA		NA		NA		4.6	J
1,2,3,4,7,8,9-HpCDF	0.0795	U	NA		2.5	J	8.7		8.6		0.2	U	0.2	U	0.2	U	NA		NA		NA		0.37	J
1,2,3,4,6,7,8,9-OCDF	0.759		NA		10.5	J	104		42.9		0.4	U	0.4	U	0.77	J	NA		NA		NA		6.6	J
TEQ	0.02	J	NA		8.33	J	46.27	J	51.56	J	0.57	J	0.0003	J	1.38	J	NA		NA		NA		2.46	J

Notes:
U = not detected at this concentration
J = estimated concentration

Appendix A - 3
Summary of Analytical Results for Off-Site Soil
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample I.D.	SS-10		SS-11		SS-12		SS-13		SS-13 DUP		SS-13 AVG	
Depth	0'-0.5'		0'-0.5'		0'-0.5'		0'-0.5'		0'-0.5'		0'-0.5'	
Date Sampled	8/18/1999		8/18/1999		8/18/1999		8/18/1999		8/18/1999		36390	
Metals (mg/kg)												
Arsenic, Total	10		2		2		3		7		5	
Barium, Total	84		32		6		22		44		33	
Cadmium, Total	1.2		0.9		0.2		0.5		0.8		1	
Chromium, Total	25		28		9.8		16		21		19	
Copper, Total	NA		NA		NA		NA		NA		NA	
Iron, Total	NA		NA		NA		NA		NA		NA	
Lead, Total	500		95		11		54		37		46	
Magnesium, Total	NA		NA		NA		NA		NA		NA	
Manganese, Total	NA		NA		NA		NA		NA		NA	
Mercury, Total	0.6		0.5		0.2	U	0.5		0.2	U	0.5	
Nickel, Total	NA		NA		NA		NA		NA		NA	
Selenium, Total	2	U	2	U	2	U	2	U	2	U	2	U
Silver, Total	0.2	U	0.2	U	0.2	U	0.2		0.2	U	0.2	U
Vanadium, Total	NA		NA		NA		NA		NA		NA	
Zinc, Total	NA		NA		NA		NA		NA		NA	
PAHs(mg/kg)												
1-Methylnapthalene	NA		NA		NA		NA		NA		NA	
2-Methylnapthalene	0.2	U	1	U	0.2	U	0.2	U	0.2	U	0.2	U
Acenapthene	0.5		5		0.2	U	0.2	U	0.2	U	0.2	U
Acenapthylene	0.3		2		0.2	U	0.2	U	0.7		0.7	
Anthracene	1		16		0.2	U	0.2	U	1		1	
Benzo(a)anthracene	3.1		60		0.2	U	0.2		2.2		1.2	
Benzo(a)pyrene	1.8		48		0.2	U	0.2		1.4		0.8	
Benzo(b)fluoranthene	3.6		70		0.2	U	0.4		2.5		1.5	
Benzo(e)pyrene	NA		NA		NA		NA		NA		NA	
Benzo(g,h,i)perylene	0.8		24		0.2	U	0.2	U	0.7		0.7	
Benzo(k)fluoranthene	0.2	U	21		0.2	U	0.2	U	0.2	U	0.2	U
Biphenyl	NA		NA		NA		NA		NA		NA	
Chrysene	2.9		53		0.2	U	0.2		1.8		1.0	
Dibenz(a,h)anthracene	0.3		8		0..2	U	0.2	U	0.2		0.2	
Fluoranthene	8.3		130		0.2	U	0.5		4.9		2.7	
Fluorene	0.4		5		0.2	U	0.2	U	0.3		0.3	
Indeno(1,2,3-c,d)pyrene	0.8		23		0.2	U	0.2	U	0.6		0.6	
Naphthalene	0.2	U	1		0.2	U	0.2	U	0.2	U	0.2	U
Perylene	NA		NA		NA		NA		NA		NA	
Phenanthrene	4.9		76		0.2	U	0.3		3.9		2.1	
Pyrene	6.3		100		0.2	U	0.5		4		2.3	
Other SVOCs mg/kg)												
Benzothiophene	NA		NA		NA		NA		NA		NA	
Dibenzothiophene	NA		NA		NA		NA		NA		NA	
Dibenzofuran	NA		NA		NA		NA		NA		NA	
Dioxins and Furans (pg/g)												
2,3,7,8-TCDD	0.86		8.1		0.097	U	0.62		NA		0.62	
1,2,3,7,8-PeCDD	4.5		44		0.24	U	2.5		NA		2.5	
1,2,3,4,7,8-HxCDD	3.8		41		0.16	U	2.2		NA		2.2	
1,2,3,6,7,8-HxCDD	6.8		80		0.18	U	4.4		NA		4.4	
1,2,3,7,8,9-HxCDD	5.3		61		0.15	U	3.6		NA		3.6	
1,2,3,4,6,7,8-HpCDD	66		800		2.1		35		NA		35	
1,2,3,4,6,7,8,9-OCDD	490		5100		34		260		NA		260	
2,3,7,8-TCDF	4.0		12		0.078		1.7		NA		1.7	
1,2,3,7,8-PeCDF	5.0		30		0.066	U	2.3		NA		2.3	
2,3,4,7,8-PeCDF	12		38		0.27		6.3		NA		6.3	
1,2,3,4,7,8-HxCDF	7.6		56		0.1	U	3.9		NA		3.9	
1,2,3,6,7,8-HxCDF	9.8		71		0.18		5.1		NA		5.1	
2,3,4,6,7,8-HxCDF	9.6		54		0.19		5.3		NA		5.3	
1,2,3,7,8,9-HxCDF	1.3		8.2		0.07	U	0.72		NA		0.72	
1,2,3,4,6,7,8-HpCDF	48		420		0.71		28		NA		28	
1,2,3,4,7,8,9-HpCDF	3.1		21		0.14	U	1.7		NA		1.7	
1,2,3,4,6,7,8,9-OCDF	41		300		4.4		23		NA		23	

Notes:
U = not detected at this concentration
J = estimated concentration

Table A- 4
Summary of Analytical Results
in Groundwater
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample ID	GW-100		CL-GW-MW-100-01		GW-101		CL-GW-MW-101-02		GW-102		CL-GW-MW 102-01		GW-103	
Date Sampled	11/6/00		12/12/2001		11/6/00		12/13/2001		11/6/00		12/12/2001		11/6/00	
Metals (mg/L)														
Arsenic	NA		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Barium	NA		0.08		0.12		0.16		0.05	U	0.01	U	0.05	U
Cadmium	NA		0.005	U	0.001	U	0.005	U	0.001	U	0.005	U	0.001	U
Chromium	NA		0.01	U	0.002	U	0.01	U	0.002	U	0.01	U	0.002	U
Copper	NA		0.01	U	NA		0.01	U	NA		0.01	U	NA	
Iron	NA		1.3		NA		0.11		NA		0.1	U	NA	
Lead	NA		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Magnesium	NA		5.0		NA		3.6		NA		4.2		NA	
Manganese	NA		0.44		NA		0.01		NA		0.01	U	NA	
Mercury	NA		NA		0.0002	U	NA		0.0002	U	NA		0.0002	U
Nickel	NA		0.025	U	NA		0.025	U	NA		0.025	U	NA	
Selenium	NA		NA		0.05	U	NA		0.05	U	NA		0.05	U
Silver	NA		NA		0.005	U	NA		0.005	U	NA		0.005	U
Vanadium	NA		0.01	U	NA		0.01	U	NA		0.01	U	NA	
Zinc	NA		0.05	U	NA		0.05	U	NA		0.05	U	NA	
Petroleum Hydrocarbon Fractions (ug/L)														
C9-C18 Aliphatics, Unadjusted	100	U	107	U	100	U	114	U	100	U	112	U	100	U
C19-C36 Aliphatics, Unadjusted	100	U	107	U	100	U	114	U	100	U	112	U	100	U
C11-C22 Aromatics, Unadjusted	100	U	107	U	100	U	114	U	100	U	112	U	100	U
C11-C22 Aromatics, Adjusted	100	U	107	U	100	U	114	U	100	U	112	U	100	U
PAHS (ug/L)														
2-Methylnapthalene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Acenapthene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Acenapthylene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Anthracene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Benzo(a)anthracene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Benzo(a)pyrene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Benzo(b)fluoranthene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Benzo(g,h,i)perylene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Benzo(k)fluoranthene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Chrysene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Dibenzo(a,h)anthracene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Fluoranthene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Fluorene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Indeno(1,2,3-cd)pyrene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U

Table A- 4
Summary of Analytical Results
in Groundwater
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample ID	GW-100		CL-GW-MW-100-01		GW-101		CL-GW-MW-101-02		GW-102		CL-GW-MW 102-01		GW-103	
Date Sampled	11/6/00		12/12/2001		11/6/00		12/13/2001		11/6/00		12/12/2001		11/6/00	
Naphthalene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Phenanthrene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Pyrene	0.2	U	100	U	0.2	U	100	U	0.2	U	100	U	0.2	U
Dioxins and Furans (pg/L)														
2,3,7,8-TCDD	NA		1.5	U	1.37	U	5.7	U	2.82	U	7.9	U	1.71	U
1,2,3,7,8-PeCDD	NA		1.7	U	1.6	U	5.9	U	7.05	U	8.9	U	1.97	U
1,2,3,4,7,8-HxCDD	NA		2.1	U	3.61	U	6.4	U	7.82	U	9.4	U	4.27	U
1,2,3,6,7,8-HxCDD	NA		2.1	U	4.12	U	6.5	U	8.81	U	9.6	U	4.55	U
1,2,3,7,8,9-HxCDD	NA		2.1	U	3.63	U	6.4	U	7.79	U	9.5	U	4.12	U
1,2,3,4,6,7,8-HpCDD	NA		2.9	U	3.92	U	10.3	U	34.5		14.5	U	46.6	
1,2,3,4,6,7,8,9-OCDD	NA		7.1	J	16	U	14.1	U	88.1		19.8	U	800	
2,3,7,8-TCDF	NA		1.3	U	2.36	U	4.4	U	3.75	U	6.1	U	2.03	U
1,2,3,7,8-PeCDF	NA		1.3	U	1.77	U	4.7	U	4.57	U	6.6	U	1.9	U
2,3,4,7,8-PeCDF	NA		1.3	U	1.73	U	4.5	U	4.61	U	6.3	U	1.78	U
1,2,3,4,7,8-HxCDF	NA		1.1	J	1.58	U	4.8	U	5.83	U	6.9	U	1.55	U
1,2,3,6,7,8-HxCDF	NA		1.3	U	1.47	U	4.9	U	5.5	U	7.1	U	1.43	U
2,3,4,6,7,8-HxCDF	NA		1.3	U	1.63	U	4.8	U	7.09	U	7	U	1.71	U
1,2,3,7,8,9-HxCDF	NA		1.6	U	2.5	U	6.1	U	10.6	U	8.9	U	2.44	U
1,2,3,4,6,7,8-HpCDF	NA		1.7	U	2.01	U	6.6	U	29.1		9.6	U	8.55	
1,2,3,4,7,8,9-HpCDF	NA		2.1	U	2.83	U	7.9	U	4.46	U	11.5	U	3.53	U
1,2,3,4,6,7,8,9-OCDF	NA		3.8	U	10.8	U	11.7	U	29.9		16.5	U	66.5	
TEQ	NA		0.11	J	0.00	U	0.00	U	0.65	J	0.00	U		

Notes:
U = not detected at this concentration
J = estimated concentration

Table A- 4
Summary of Analytical Results
in Groundwater
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample ID	GW-103 Dup.		GW-103 AVG		CL-GW-MW 103-01		CL-GW-MW 103DUP-01		CL-GW-MW-103-01 AVG	
Date Sampled	11/6/00		11/6/00		12/12/2001		12/12/2001		12/12/2001	
Metals (mg/L)										
Arsenic	0.01	U	0.01	U	0.01	U	NA		0.01	U
Barium	0.05	U	0.05	U	0.01	U	NA		0.01	U
Cadmium	0.001	U	0.001	U	0.005	U	NA		0.005	U
Chromium	0.002	U	0.002	U	0.01	U	NA		0.01	U
Copper	NA		NA		0.01	U	NA		0.01	U
Iron	NA		NA		4.0		NA		4.0	
Lead	0.01	U	0.01	U	0.01	U	NA		0.01	U
Magnesium	NA		NA		1.4		NA		1.4	
Manganese	NA		NA		0.12		NA		0.12	
Mercury	0.0002	U	0.0002	U	NA		NA		NA	
Nickel	NA		NA		0.025	U	NA		0.025	U
Selenium	0.05	U	0.05	U	NA		NA		NA	
Silver	0.005	U	0.005	U	NA		NA		NA	
Vanadium	NA		NA		0.01	U	NA		0.01	U
Zinc	NA		NA		0.05	U	NA		0.05	U
Petroleum Hydrocarbon Fractions (ug/L)										
C9-C18 Aliphatics, Unadjusted	100	U	100	U	117	U	112	U	114.5	U
C19-C36 Aliphatics, Unadjusted	100	U	100	U	117	U	112	U	114.5	U
C11-C22 Aromatics, Unadjusted	100	U	100	U	117	U	112	U	114.5	U
C11-C22 Aromatics, Adjusted	100	U	100	U	117	U	112	U	114.5	U
PAHS (ug/L)										
2-Methylnapthalene	0.2	U	0.2	U	100	U	100	U	100	U
Acenapthene	0.2	U	0.2	U	100	U	100	U	100	U
Acenapthylene	0.2	U	0.2	U	100	U	100	U	100	U
Anthracene	0.2	U	0.2	U	100	U	100	U	100	U
Benzo(a)anthracene	0.2	U	0.2	U	100	U	100	U	100	U
Benzo(a)pyrene	0.2	U	0.2	U	100	U	100	U	100	U
Benzo(b)fluoranthene	0.2	U	0.2	U	100	U	100	U	100	U
Benzo(g,h,i)perylene	0.2	U	0.2	U	100	U	100	U	100	U
Benzo(k)fluoranthene	0.2	U	0.2	U	100	U	100	U	100	U
Chrysene	0.2	U	0.2	U	100	U	100	U	100	U
Dibenzo(a,h)anthracene	0.2	U	0.2	U	100	U	100	U	100	U
Fluoranthene	0.2	U	0.2	U	100	U	100	U	100	U
Fluorene	0.2	U	0.2	U	100	U	100	U	100	U
Indeno(1,2,3-cd)pyrene	0.2	U	0.2	U	100	U	100	U	100	U

Table A- 4
Summary of Analytical Results
in Groundwater
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample ID	GW-103 Dup.		GW-103 AVG		CL-GW-MW-103-01		CL-GW-MW-103DUP-01		CL-GW-MW-103-01 AVG	
Date Sampled	11/6/00		11/6/00		12/12/2001		12/12/2001		12/12/2001	
Naphthalene	0.2	U	0.2	U	100	U	100	U	100	U
Phenanthrene	0.2	U	0.2	U	100	U	100	U	100	U
Pyrene	0.2	U	0.2	U	100	U	100	U	100	U
Dioxins and Furans (pg/L)										
2,3,7,8-TCDD	1.22	U	1.465	U	6.7	U	5.9	U	6.3	U
1,2,3,7,8-PeCDD	1.52	U	1.745	U	7.8	U	6.6	U	7.2	U
1,2,3,4,7,8-HxCDD	3.74	U	4.005	U	8.7	U	7.1	U	7.9	U
1,2,3,6,7,8-HxCDD	4.01	U	4.28	U	8.9	U	7.3	U	8.1	U
1,2,3,7,8,9-HxCDD	3.62	U	3.87	U	8.8	U	7.2	U	8	U
1,2,3,4,6,7,8-HpCDD	6.1	U	46.6		13.5	U	10.6	U	12.05	U
1,2,3,4,6,7,8,9-OCDD	15.2		407.6		19.1	U	15.2	U	17.15	U
2,3,7,8-TCDF	2.63	U	2.33	U	5.4	U	5.1	U	5.25	U
1,2,3,7,8-PeCDF	2.26	U	2.08	U	5.7	U	5.4	U	5.55	U
2,3,4,7,8-PeCDF	2.11	U	1.945	U	5.4	U	5.1	U	5.25	U
1,2,3,4,7,8-HxCDF	1.12	U	1.335	U	6.6	U	5.5	U	6.05	U
1,2,3,6,7,8-HxCDF	1.03	U	1.23	U	6.8	U	5.7	U	6.25	U
2,3,4,6,7,8-HxCDF	1.24	U	1.475	U	6.7	U	5.6	U	6.15	U
1,2,3,7,8,9-HxCDF	1.89	U	2.165	U	8.5	U	7.1	U	7.8	U
1,2,3,4,6,7,8-HpCDF	3.35	U	8.55		9.3	U	7.2	U	8.25	U
1,2,3,4,7,8,9-HpCDF	5.15	U	4.34	U	11.1	U	8.6	U	9.85	U
1,2,3,4,6,7,8,9-OCDF	12.2		39.35		15.9	U	12.7	U	14.3	U
TEQ			0.60	J	0.00	U	0.00	U	0.00	U

Notes:
U = not detected at this concentration
J = estimated concentration

Appendix A-5b
Dioxin and Furan Analytical Results in Sediment
Former Lawrence Thermal Conversion Facility
Lawrence, Massachusetts

Sample #	BC-SED-303	BC-SED-OUTFALL	SP-3	SP-9	SP-11	SP-53	SP-56	SP-62	SP-65	SP-71	SP-74	DUP	SP-BG-1	SP-BG-2	SP-BG-3	SP-BG-4
Date Collected	11/08/02	11/08/02	06/06/03	06/06/03	06/06/03	06/06/03	06/06/03	06/06/03	06/06/03	06/06/03	06/06/03	06/06/03	07/25/03	07/25/03	07/25/03	07/25/03
Location	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	SP-74 Dup. Site	Upstream	Upstream	Upstream	Upstream
Dioxins and Furans (pg/g)																
2,3,7,8-TCDD	11.7	0.73 J	2.1	9.2	0.93 J	14.2	32.1	0.94 J	0.60 J	6.3	30.3	73.9	EMPC 0.93 J	0.37 J	1.1	<0.2
1,2,3,7,8-PeCDD	52.8	3.7 J	9.8	43.1	EMPC 2.9 J	58.1	144	4.1 J	EMPC 2.9 J	27.6	169	341	5.9	2.0 J	2.7 J	<0.3
1,2,3,4,7,8-HxCDD	54.9	4.5 J	10.2	44.7	3.8 J	67.2	189	5.5	2.6 J	35.6	191	451	7.4	2.3 J	2.8 J	0.48 J
1,2,3,6,7,8-HxCDD	77.5	5.4	12.7	59.8	4.3 J	73.9	221	7.6	5.8	61.1	226	517	9.8	3.5 J	8.6	EMPC 0.52 J
1,2,3,7,8,9-HxCDD	135	8.3	21.6	81.2	8.9	152	476	7.9	6.6	92.9	272	721	16.1	4.9	6.5	1.1 J
1,2,3,4,6,7,8-HpCDD	605	49.1	117	539	32.1	562	1840	49.9	35.4	449	1980	4500 E	120	48.3	138	7.5
1,2,3,4,6,7,8,9-OCDD	1130	124	444	2250	78.9	1360	3900	133	101	1010	5290 E	10420 E	716	289	1230	39.7
2,3,7,8-TCDF	13.6	0.72	2.6	18.8	5.7	19.3	39.9	1.3	0.86 J	11.2	35.8	82.7	1.7	0.87 J	7.1	2.0
1,2,3,7,8-PeCDF	60.6	8.2	5.0	<0.1	2.7 J	41.2	97.1	1.9 J	2.1 J	17.9	83	174	EMPC 38.9 X	EMPC 25.7 X	EMPC 243 X	9.2
2,3,4,7,8-PeCDF	46.5	2.6 J	8.1	40.1	EMPC 5.2 J	57.2	129	2.6 J	EMPC 2.4 J	33.3	70.2	196	5.9	2.2 J	9.2	1.5 J
1,2,3,4,7,8-HxCDF	151	11.3	24.9	109	11.3	191	469	11	8.1	103	400	1020	20.3	6.0	15.8	4.1 J
1,2,3,6,7,8-HxCDF	79.4	6.1	13.5	64.6	6.2	98.5	230	5.7	4.3 J	52.5	222	507	11.2	3.5 J	11.9	1.6 J
2,3,4,6,7,8-HxCDF	59.2	3.5 J	9.7	62.4	4.7 J	66.1	159	4.3 J	3.5 J	42.9	108	293	9.0	3.4 J	19.0	1.7 J
1,2,3,7,8,9-HxCDF	4.1 J	<0.3	1.5 J	<0.2	<0.9	3.7 J	9.6	EMPC 0.44 X	EMPC 0.42 J	1.7 J	EMPC 11.3 X	EMPC 31 X	0.50 J	<0.3	<0.4	<0.3
1,2,3,4,6,7,8-HpCDF	365	29.6	63.8	320	22.8	414	1130	27.0	17.5	212	1090	2610 E	50.2	17.6	53.0	7.0
1,2,3,4,7,8,9-HpCDF	22.2	EMPC 1.1 J	3.6J	13.6	<2.0	17.5	52.5	1.3 J	0.88 J	13.4	49.2	105	3.6 J	1.8 J	3.0 J	<0.5
1,2,3,4,6,7,8,9-OCDF	134	36.4	38.9	164	<8.8	129	381	13.8	10.5	104	421	725	49.0	22.5	94.0	4.8 J
Total TCDD	206	14.1	29.0	107	10	237	507	12	11.5	172	295	780	15.4	3.9	23.2	4.4
Total PeCDD	458	31.8	80.9	226	33.1	509	1190	39.6	9.6	364	1280	2260	50.8	8.8	31.4	2.5
Total HxCDD	869	64.9	135	662	53.8	916	2770	81	54.1	721	2510	5850 E	116	33.6	89.8	12.1
Total HpCDD	1150	95.6	226	1080	64.2	1110	3530	90.2	72.8	892	3850	8310 E	238	96.1	295	15.0
Total TCDF	479	28.1	80.8X	668 XE	66 X	639 X	1170	30.9 X	33.8 X	350 X	846 X	1990 E	59.1 X	24.1 X	264 XE	32.8 X
Total PeCDF	676	55.6	120.0	1230 X	51.1	799	1610	40.6	38.7	418	1260	2860	80.4 X	32.2 X	463 X	26.7 X
Total HxCDF	689	52.3	120	914 X	51.3	848	2000	51.2	46.8	484	1760	4070	108 X	37.4 X	306 X	15.3 X
Total HpCDF	499	34.6	93.0	432	28.1	529	1430	39.4	26	299	1430	2950 E	80.3 X	30.4 X	114 X	10.4

Notes

J = Concentration is based on an analyte to internal standard ratio which is below the calibration curve. Values outside the calibration curve are estimates only.

E = Concentration is based on an analyte to internal standard ratio which exceeds the range of the calibration curve. Values outside the curve are estimates only.

X = PCDF peak has eluted at the same time as the associated DPE, and the DPE peak intensity is at least ten percent of the total PCDF peak intensity.

EMPC = Estimated Maximum Possible Concentration. Meets all identification criteria except ion abundance ratio

APPENDIX B

COPY OF EXISTING ACTIVITY AND USE LIMITATION

Form 1084C

310 CMR 40.1099

Form 1075

NOTICE OF ACTIVITY AND USE LIMITATION
M.G.L. c. 21E, § 6 and 310 CMR 40.0000

Disposal Site Name: **Former Lawrence Thermal Conversion Facility**
DEP Release Tracking No.(s): 3-19158

This Notice of Activity and Use Limitation ("Notice") is made as of this 18th day of November, 2005, by Covanta Haverhill Properties, Inc. (f/k/a Ogden Haverhill Properties, Inc.) (100 Recovery Way, Haverhill, Massachusetts, 01835), together with his/her/its/their successors and assigns (collectively "Owner").

WITNESSETH:

WHEREAS, Covanta Haverhill Properties, Inc. is the owner in fee simple of those certain parcel(s) of land located in Lawrence, Essex County, Massachusetts pursuant deeds recorded with the Essex County Registry of Deeds in Book 2471, Page 6 and Book 2563, Page 210, as affected by the deed recorded at Book 4027, Page 313;

WHEREAS, said parcel(s) of land, which is more particularly bounded and described in Exhibit A, attached hereto and made a part hereof ("Property") is subject to this Notice of Activity and Use Limitation. The Property is shown on a plan recorded in the Essex County Registry of Deeds in Plan 8886;

WHEREAS, the Property comprises all of a disposal site as the result of a release of oil and/or hazardous material. Exhibit B is a sketch plan showing the relationship of the Property subject to this Notice of Activity and Use Limitation to the boundaries of said disposal site existing within the limits of the Property and to the extent such boundaries have been established. Exhibit B is attached hereto and made a part hereof; and

WHEREAS, one or more response actions have been selected for the Disposal Site in accordance with M.G.L. c. 21E ("Chapter 21E") and the Massachusetts Contingency Plan, 310 CMR 40.0000 ("MCP"). Said response actions are based upon (a) the restriction of human access to and contact with oil and/or hazardous material in soil and/or (b) the restriction of certain activities occurring in, on, through, over or under the Property. The basis for such restrictions is set forth in an Activity and Use Limitation Opinion ("AUL Opinion"), dated Oct 24, (which is attached hereto as Exhibit C and made a part hereof);

NOW, THEREFORE, notice is hereby given that the activity and use limitations set forth in said AUL Opinion are as follows:

1. Activities and Uses Consistent with the AUL Opinion. The AUL Opinion provides that a condition of No Significant Risk to health, safety, public welfare or the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.0000) so long as any of the following activities and uses occur on the Property:

(i) Industrial uses, including but not limited to a parking lot;

The language in these forms are part of promulgated regulations and cannot be modified in any way unless so noted (within brackets) in the form itself.

Property Address: 35 Winthrop Street, Lawrence, MA 01841

2005 NOV 28 A 9:36

35519

(ii) Underground utility and/or construction activities including, maintenance, or repair of site improvements, or utility repair and maintenance, excavation, movement and handling of soils provided that such activities are conducted in accordance with a Soil Management Plan and a Health and Safety Plan in accordance with Conditions (i) and (ii) in Paragraph 3 of this Notice, the remediation waste management procedures of the MCP cited at 310 CMR 40.0030 *et seq.*, and all applicable worker health and safety practices pursuant to 310 CMR 40.0018;

(iii) Such other activities or uses which, in the Opinion of an LSP, shall present no greater risk of harm to health, safety, public welfare or the environment than the activities and uses set forth in this Paragraph; and

(iv) Such other activities and uses not identified in Paragraph 2 as being Activities and Uses Inconsistent with the AUL.

2. Activities and Uses Inconsistent with the AUL Opinion. Activities and uses which are inconsistent with the objectives of this Notice of Activity and Use Limitation, and which, if implemented at the Property, may result in a significant risk of harm to health, safety, public welfare or the environment or in a substantial hazard, are as follows:

(i) Residential uses, including but not limited to, one family or two-family dwellings, apartments, tenement houses, condominiums or town houses, mobile homes, lodging houses, nursing or rest homes, or dormitories;

(ii) Agricultural uses, including, but not limited to tilling and planting of gardens or crops for human consumption;

(iii) Institutional uses, including, but not limited to public or private schools, day care facilities, public libraries, museums, or hospitals;

(iv) Activities or uses which are likely to involve the removal and/or disturbance of the soil at the Property with the exception of underground utility and/or construction work carried out in accordance with the Conditions set forth under Paragraph 3, unless an LSP renders an Opinion which states that a Level of No Significant Risk is maintained at the site consistent with the MCP; and

(v) Any use or activity that may involve direct ongoing contact to the soil, or any use or activity that may not comply with the Conditions set forth under Paragraph 3.

3. Obligations and Conditions Set Forth in the AUL Opinion. If applicable, obligations and/or conditions to be undertaken and/or maintained at the Property to maintain a condition of No Significant Risk as set forth in the AUL Opinion shall include the following:

(i) A Soil Management Plan (SMP) must be prepared by an LSP in accordance with the remediation waste management procedures of the MCP (310 CMR 40.0030 *et seq*) and implemented at the commencement of any activity that may disturb soil or groundwater

located at the property. The SMP should include, at a minimum, the following elements: identification of the type and location of hazardous materials in the soil or a sampling and analysis plan (if insufficient data is available), handling procedures, description of staging and storage areas, transportation and treatment/disposal methods, spill prevention and control measures, and a contingency plan. The SMP should be available at the property throughout the course of soil and groundwater disturbance and handling activities; and

(ii) A Health and Safety Plan (HASP) must be prepared by a Certified Industrial Hygienist, or other qualified individual sufficiently trained in worker health and safety requirements, and implemented prior to the commencement of any activity that may disturb the soil located at the property. The HASP shall include, at a minimum, the following elements: identification of the type and location of hazardous materials in the soil and/or groundwater, personnel training requirements, personal protection equipment to be used, monitoring devices and procedures, site control measures, decontamination plan, and emergency/contingency plan.

4. Proposed Changes in Activities and Uses. Any proposed changes in activities and uses at the Property which may result in higher levels of exposure to oil and/or hazardous material than currently exist shall be evaluated by an LSP who shall render an Opinion, in accordance with 310 CMR 40.1080 *et seq.*, as to whether the proposed changes will present a significant risk of harm to health, safety, public welfare or the environment. Any and all requirements set forth in the Opinion to meet the objective of this Notice shall be satisfied before any such activity or use is commenced.

5. Violation of a Response Action Outcome. The activities, uses and/or exposures upon which this Notice is based shall not change at any time to cause a significant risk of harm to health, safety, public welfare, or the environment or to create substantial hazards due to exposure to oil and/or hazardous material without the prior evaluation by an LSP in accordance with 310 CMR 40.1080 *et seq.*, and without additional response actions, if necessary, to achieve or maintain a condition of No Significant Risk or to eliminate substantial hazards.

If the activities, uses, and/or exposures upon which this Notice is based change without the prior evaluation and additional response actions determined to be necessary by an LSP in accordance with 310 CMR 40.1080 *et seq.*, the owner or operator of the Property subject to this Notice at the time that the activities, uses and/or exposures change, shall comply with the requirements set forth in 310 CMR 40.0020.

6. Incorporation Into Deeds, Mortgages, Leases, and Instruments of Transfer. This Notice shall be incorporated either in full or by reference into all future deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer, whereby an interest in and/or a right to use the Property or a portion thereof is conveyed.

Owner hereby authorizes and consents to the filing and recordation and/or registration of this Notice, said Notice to become effective when executed under seal by the undersigned LSP, and recorded and/or registered with the appropriate Registry(ies) of Deeds and/or Land Registration Office(s).

Form 1084C

310 CMR 40.1099

WITNESS the execution hereof under seal this 18th day of November, 2005.

Covanta Haverhill Properties, Inc.

By: Ted Hoefler

COMMONWEALTH OF MASSACHUSETTS

Essex, ss

Nov 18, 2005

Then personally appeared the above-named Ted Hoefler and acknowledged the foregoing instrument to be his free act and deed before me,

My Commission Expires
October 30, 2009

Notary Public:
My Commission Expires:

The undersigned LSP hereby certifies that he executed the aforesaid Activity and Use Limitation Opinion attached hereto as Exhibit C and made a part hereof and that in his Opinion this Notice of Activity and Use Limitation is consistent with the terms set forth in said Activity and Use Limitation Opinion.

Date: 11/22/05

Charles Myette

COMMONWEALTH OF MASSACHUSETTS

Essex, ss

Nov 22, 2005

Then personally appeared the above named Charles Myette and acknowledged the foregoing instrument to be his free act and deed before me,

Notary Public: Christine Smallwood
My Commission Expires:

Christine Lee Smallwood Notary Public
Commonwealth of Massachusetts
My Commission Expires 9/25/2009

Upon recording, return to:

Covanta Haverhill Properties, Inc.
100 Recovery Way
Haverhill, MA 01835

The language in these forms are part of promulgated regulations and cannot be modified in any way unless so noted (within brackets) in the form itself.

EXHIBIT A

The land in Lawrence and Methuen, Essex County, Commonwealth of Massachusetts and described as follows:

SOUTHERLY	by said Manchester Street by two lines measuring respectively 96.94 feet and 38 feet;
WESTERLY	by land now or formerly of Boston & Maine Railroad Company, 15 feet;
SOUTHERLY	by land now or formerly of said Railroad, 22.06 feet;
SOUTHWESTERLY	by land now or formerly of said Railroad, 137.60 feet;
SOUTHEASTERLY	by land now or formerly of said Railroad, 12.63 feet;
SOUTHWESTERLY	by land now or formerly of said Railroad, 60 feet;
SOUTHEASTERLY	by land now or formerly of said Railroad, 12.50 feet;
WESTERLY	by land now or formerly of said Railroad by seventeen courses, 256.86 feet, 142.26 feet, 201.50 feet, 39.90 feet, 69.10 feet, 38.30 feet, 19.90 feet, 29.40 feet, 39 feet, 20 feet, 56.30 feet, 23.90 feet, 24.10 feet, 48.10 feet, 24.30 feet, 23.90 feet, and 24.50 feet;
SOUTHWESTERLY	by land now or formerly of said Railroad, 142 feet, more or less;
NORTHWESTERLY	by a line in the Spicket River and also partly by Steven's Pond (so-called), 106 feet, more or less;
WESTERLY	by another line in Steven's Pond, 468 feet;
NORTHERLY	by another line in said Steven's Pond, 89 feet;
EASTERLY	by land now or formerly of Greater Lawrence Industrial Associates, Inc. ("GLIA") by a line following the Easterly edge of said Steven's Pond, 470 feet, more or less;
NORTHEASTERLY	by said land now or formerly of GLIA being a line running along the Northeasterly abutment of a certain bridge, 58 feet, more or less;
NORTHEASTERLY	again by other land now or formerly of GLIA and by land now or formerly of Dabro Realty Corpozation, 515 feet, more or less;
SOUTHEASTERLY	by land now or formerly of said Dabro Realty Corporation by the Northwesterly wall of Building 21, 25 feet, more or less;
NORTHEASTERLY	by land now or formerly of said Dabro Realty Corporation by a line running for the most part along the Southwesterly wall of said Building 21, 315 feet, more or less;
NORTHEASTERLY	again, by other land now or formerly of GLIA by a line running along the edge of said Steven's Pond, 79.2 feet, more or less;
NORTHEASTERLY	again, by land now or formerly of Albert I. Alexander, Jr. et al by a line running in part along the Southwesterly wall of Building 19 shown on a plan hereinafter referred to, 78.45 feet;

EXHIBIT A

NORTHEASTERLY	by a parcel shown with a "trailer" thereon, which parcel is described below as the "Excluded Parcel," on a course shown as S 84° 32'30" W 9.88 feet and continuing on the same course for the length of the Excluded Parcel, of approximately 45 feet, more or less;
EASTERLY	on a private way by two lines measuring respectively, 11.18 feet and 143.79 feet;
SOUTHERLY	by land now or formerly of Malden Mills, Inc., 43.32 feet;
WESTERLY	by the same, 16.76 feet;
SOUTHERLY	by the same, 482.59 feet;
EASTERLY	by the same, 13.0 feet;
SOUTHERLY	by the same, 120.0 feet;
EASTERLY	by said other land of Malden Mills, Inc., 159.42 feet;
NORTHERLY	by the same by a curved line with a radius of 65.11 feet and measuring 102.16 feet;
NORTHEASTERLY	by the same by a line in a private way, 56.78 feet; and
EASTERLY	by land now or formerly of Dominic DiMaggio et al and by land now or formerly of Charles A. Maroun et al, 388.76 feet,

Reference is hereby made to a plan entitled "Plan of Land Prepared For Refuse Fuels, Inc." by Frank C. Gelinas Associates, Inc., last revised May 21, 1982, and recorded with the Essex North District Registry of Deeds as Plan #8896 (the "Plan").

The above described premises are shown on the Plan as Parcel 1; Building 13—Parcel 2; Parcel 3 (excepting and excluding the Excluded Parcel); and a parcel abutting Parcel 1 and shown and designated "N/F Malden Mills, Inc."

Excluded Parcel

There is excepted and excluded from the above described premises that portion (the "Excluded Parcel") of Parcel 3 shown on the Plan as an area near Building 19, marked as "encroachment" and shown as partially located on such area is a "Trailer." The Excluded Parcel is more particularly bounded and described as follows:

NORTHWESTERLY	by land now or formerly of Albert I. Alexander, Jr. et al, 44.28 feet; and
NORTHEASTERLY AND EASTERLY	on a private way by two lines measuring respectively 20.95 feet and 29.29 feet;
SOUTHERLY	by Parcel 3, on a course shown as S 84° 32'30" W, approximately 45 feet to the point of the beginning.

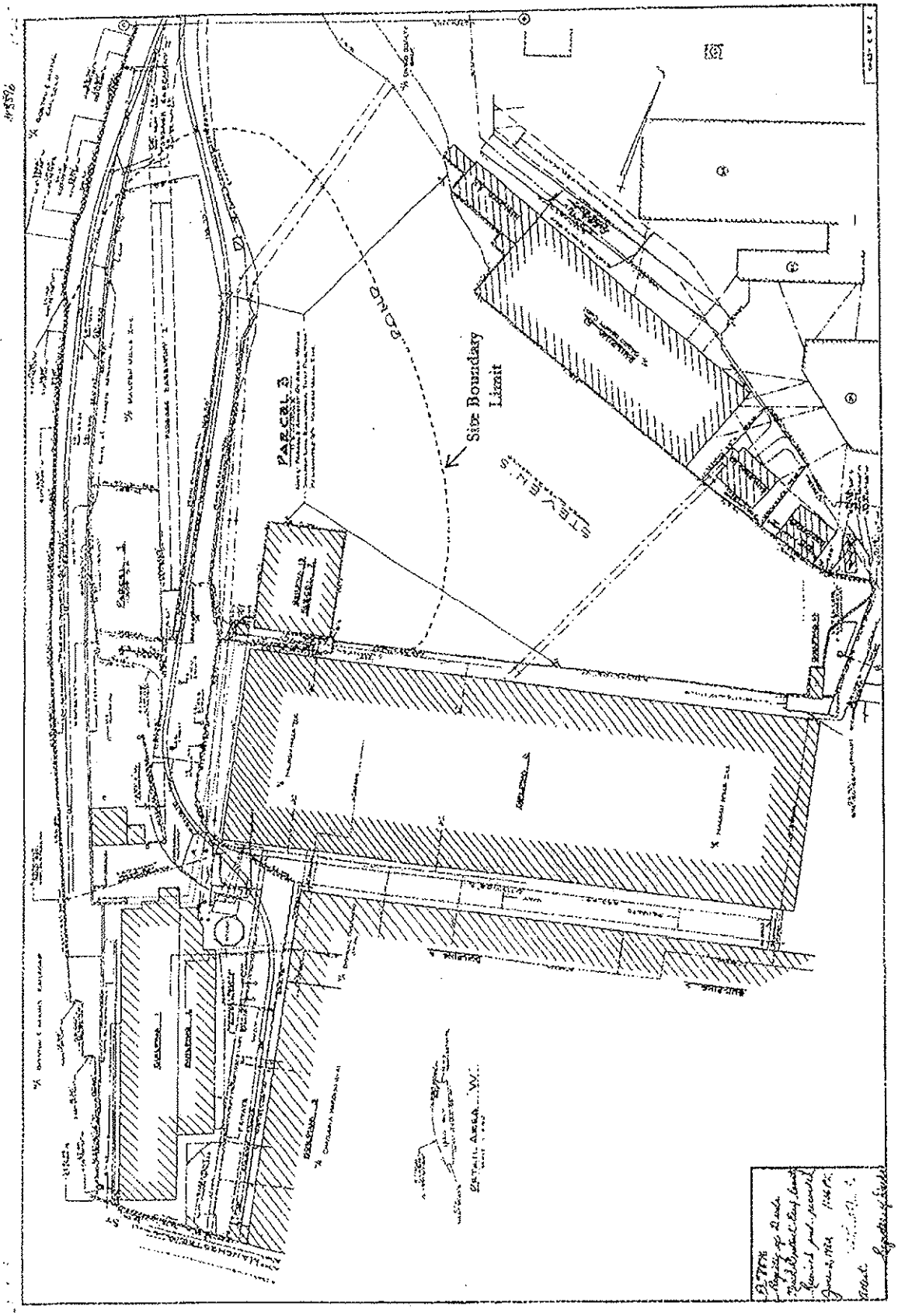

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Exhibit B

EXHIBIT C

ACTIVITY AND USE LIMITATION OPINION
FORMER LAWRENCE THERMAL CONVERSION FACILITY

In accordance with the requirements of 310 CMR 40.1074, this Activity and Use Limitation Opinion has been prepared to support a Notice of Activity and Use Limitation (AUL) for the Property referred to as the Former Lawrence Thermal Conversion Facility located at 85 Manchester Street, Lawrence, Massachusetts. The boundaries of the property that is the subject of this AUL generally coincide with the boundaries of the Disposal Site identified as Former Lawrence Thermal Conversion Facility Site, as illustrated by Exhibit B, however, the AUL includes all of Stevens Pond, while only a small portion of Stevens Pond lies within the Site boundaries.

This Opinion describes specific restriction on uses and activities at the Former Lawrence Thermal Conversion Facility property that must be enforced to maintain a Condition of No Significant Risk to health, safety, public welfare and the environment as defined under the Massachusetts Contingency Plan (310 CMR 40.0000). The restrictions contained within this Opinion are based on the assumptions and results of a Method 3 Risk Characterization for the Site.

The 7 acre property is currently zoned for industrial use. The property consists of a narrow strip of land and Stevens Pond to the east. The Site consists of most of the land portion of the property and extends into Stevens Pond. The surrounding land use is mostly industrial, including mill buildings on the northeast side of the pond.

Background

In 1998, the Former Lawrence Thermal Conversion Facility ceased operations. As part of post-closure activities, Ogden Environmental and Energy Services (OEES) conducted a voluntary soil characterization program in 1999 to assess the post-closure conditions of the site. Elevated concentrations of metals, polynuclear aromatic hydrocarbon (PAH) compounds, and dioxins were detected in shallow soils, triggering notification requirements to the Department of Environmental Protection (DEP). The site was assigned Release Tracking Number (RTN) 3-19158. A Phase I Initial Site Investigation Report and Tier Classification was completed by AMEC Earth and Environmental, Inc. (AMEC, formerly known as OEES) and submitted to the Department of Environmental Protection (DEP) in January 2001. A Phase II Comprehensive Site Assessment (CSA) was

conducted by Brown and Caldwell between December 2001 and July 2003 that included the evaluation of groundwater quality and soil contamination at the Site, a bathymetric survey of Stevens Pond, sediment sampling from Stevens Pond, an evaluation of background concentrations of contaminants, and a geochemical forensics evaluation to determine the source origin of dioxin. Release Abatement Measure (RAM) activities were conducted by Brown and Caldwell between January 2004 and January 2005 that included excavation of impacted soils at the Site and additional evaluation of soil contamination at the Site. A Supplemental Phase II CSA was conducted by Brown and Caldwell between January 2004 and April 2005 which included the RAM activities as well as a Method 3 Risk Assessment prepared by Menzie-Cura & Associates, Inc.

The site investigations and risk characterization conducted for the Former Lawrence Thermal Conversion Facility are described in the following reports:

- Phase I Initial Site Investigation, Lawrence Thermal Conversion Facility, 85 Manchester Street, Lawrence, Massachusetts, Release Tracking Number 3-19158, AMEC Earth and Environmental, Inc., January 2001
- Phase II Comprehensive Site Assessment Report, Former Lawrence Thermal Conversion Facility, Lawrence, Massachusetts, Release Tracking Number 3-19158, Brown and Caldwell, January 2004
- Supplemental Phase II Comprehensive Site Assessment Report, Former Lawrence Thermal Conversion Facility, Lawrence, Massachusetts, Release Tracking Number 3-19158, Brown and Caldwell, April 2005

Site History/Use

In the 1800s, the Site was developed as an ice house company. In the early 1900s, portions of Stevens Pond were filled and a power plant was constructed to support the adjacent manufacturing mills. Comparison of the 1949 Site Plan with an 1895 Site Plan (Sanborn Fire Insurance Maps) indicates that Stevens Pond was approximately 8 acres larger in 1895 (AMEC Phase I Report, January 2001). As a result of filling activity, approximately 2.3 acres of what was formerly Stevens Pond is now part of the land portion of the Site. The remaining 5.7 acres underlies buildings on the site or on the adjacent properties. Based on observations in test pits and soil borings at the Site, this fill material consisted of demolition material, brick, fire brick, concrete, coal, wood, coal ash/wood ash, and clinkers. After the filling activity ceased, the Site was covered with cobblestone surface and concrete, and a railroad yard was constructed. Sanborn Fire Insurance Maps from the early to mid 1900s

indicate that the Site uses included the railroad yard and coal storage. The railroad spurs were active and in place until at least 1949. Sometime between 1949 and 1961, the railroad spurs were abandoned and additional fill material was placed across the Site. A 1961 aerial photo shows that the Site was covered with buildings and asphalt. A Refuse Derived Fuel (RDF) Thermal Conversion Facility was constructed on the Site in the 1980s. Using municipal solid waste as fuel, the RDF facility produced steam and electricity to supply the adjacent mills. The RDF operations shut down on June 5, 1998, and the facility has since been decommissioned.

Site Investigation and Risk Characterization

The results of the site investigations have been used to characterize the nature and extent of contamination across the site:

- Based on two rounds of groundwater sampling, there were no exceedances of the applicable Method 1 groundwater standard (GW-3) in the groundwater samples collected from wells MW-100, MW-101, MW-102, and MW-103.
- Metals and polynuclear aromatic hydrocarbon (PAH) compounds were detected in several downgradient sediment samples from Stevens Pond at concentrations in excess of Freshwater Sediment Screening Values. Dioxin was detected in all nine downgradient sediment samples collected (there is no applicable standard for dioxin in sediment). In four upgradient sediment samples from Stevens Pond, metals and PAHs were detected at concentrations in excess of Freshwater Sediment Screening Values and dioxins were also detected.
- Soil excavation conducted during the RAM activities in 2004 and 2005 removed from the Site all Upper Concentration Limit (UCL) and S-3/GW-3 exceedances for dioxin, all S-3/GW-3 exceedances for PAH compounds (there were no UCL exceedances for PAHs), and all UCL exceedances for metals. There are some exceedances of S-3/GW-3 for arsenic that remain in the lower fill layer soils. As described earlier, this lower fill layer consists of poor quality urban fill which includes demolition material, coal, wood, coal ash/wood ash, clinkers brick, fire brick, and concrete that was placed on the site in the early 1900s.
- No disposal of oil or hazardous material (OHM) or incinerator ash related to the operations of the Former Thermal Conversion Facility were identified anywhere onsite.

As described in the Supplemental Phase II CSA Report (Brown and Caldwell, April 2005), based on several lines of evidence, it appears that the elevated levels of PAH compounds, metals, and dioxin at the site are attributable to coal ash or wood ash associated with urban fill material. The site is surrounded by old mill buildings with a long history of industrial usage. The site was formerly used as

a coal storage yard and a railroad yard. The site has a long history of filling activities, as evidenced by the observation of coal, coal ash, coal clinkers, brick, fire brick, wood fragments, and other industrial materials in site soils during several subsurface investigations. The widespread distribution of dioxin, metals, and PAHs in the onsite soils indicates the ubiquitous presence of fill material. A majority of the detections of metals, PAHs, and dioxins in onsite soil from the lower fill layer falls below the DEP's background levels for metals, PAHs, and dioxins in fill material. The statistical analyses of dioxin data indicate that the RDF ash signal was not present in any soil samples collected from the site or in any of the sediment samples collected from Stevens Pond. A high temperature incineration and/or combustion source signal mostly likely related to combustion processes, clinkers from coal burning, ash from coke production, or ash from the burning of wood is the dominant signal in soil and some sediment samples. A "background" signal is the dominant signal in the majority of sediment samples in Stevens Pond, and is a component of the signal in many of the onsite soil samples, particularly in the upper fill layer (which was largely removed during the RAM excavation). Finally, there is no history of identifiable releases at the site that could account for the widespread distribution of elevated concentrations of PAHs, metals, and dioxins. As evidenced by Sanborn Fire Insurance maps and aerial photographs, the urban fill was placed onsite and paved over prior to 1961. The RDF facility was not constructed on the site until the 1980s, more than twenty years after the fill had been placed.

Therefore, constituents of concern observed at the site are likely not attributable to site releases. Elevated levels of PAH compounds, metals, and dioxins in site soils and sediments have a high probability of being attributable to a background condition. Metals, PAHs, and dioxins in the urban fill are likely attributable to combustion processes associated with industrial operations, motor vehicle and railroad engines, and combustion of wood, coal, and petroleum. Metals, PAHs, and dioxins present in Stevens Pond sediments are attributable to this same source of urban fill as well as upgradient combustion sources. However, because some of the constituents identified were above "background" conditions, a Release Abatement Measure (RAM) and a Method 3 Risk Assessment were completed for the Site to evaluate potential risks associated with residual site soils, groundwater, and sediment.

The risk assessment concluded that a condition of "no significant risk" of harm to human health, the environment, public welfare, and public safety exists at the site. The risk assessment assumes that an Activity and Use Limitation (AUL) will be recorded with the property deed that restricts future residential and institutional uses.

Reason for Activity and Use Limitation

An AUL is necessary to limit exposure to contaminated soils remaining onsite so that a condition of No Significant Risk is maintained for future foreseeable site activities and uses. The following assumptions used in and/or results of the risk characterization necessitate an AUL:

- Future uses will be limited to those involving exposures to Site media that are the same or less than the exposures evaluated in the risk assessment,

- Future land use at the Site will remain industrial/commercial, although a parking lot to support any use of adjacent properties may be developed.

1. Permitted Uses and Activities

A condition of No Significant Risk to health, safety, public welfare or the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.000) so long as any of the following activities and uses occur on the Property:

(i) Industrial uses, including but not limited to a parking lot, and
(ii) Uses involving exposures to Site media that are the same or less than exposures evaluated in the Risk Assessment.

2. Restricted Uses and Activities

Activities and uses which are inconsistent with the Response Action Outcome Statement and supporting Risk Characterization and which, if implemented, at the Property, may result in a significant risk of harm to health, safety, public welfare or the environment or in a substantial hazard within the meaning of the MCP, are as follows:

(i) Residential uses, including but not limited to, one family or two-family dwellings, apartments, tenement houses, condominiums or town houses, mobile homes, lodging houses, nursing or rest homes, or dormitories;
(ii) Agricultural uses, including, but not limited to tilling and planting of gardens or crops for human consumption;

(iii) Institutional uses, including, but not limited to public or private schools, day care facilities, public libraries, museums, or hospitals;

(iv) Activities or uses which are likely to involve the removal and/or disturbance of the soil at the Property with the exception of underground utility and/or construction work carried out in accordance with the Conditions set forth under Paragraph 3, unless an LSP renders an Opinion which states that a Level of No Significant Risk is maintained at the site consistent with the MCP; and

(v) Any use or activity that may involve direct ongoing contact to the soil, or any use or activity that may not comply with the Conditions set forth under Paragraph 3.

3. Obligations and Conditions

Obligations and/or conditions to be undertaken and/or maintained at the Property to maintain the Condition of No Significant Risk as set forth in the AUL Opinion shall include the following:

(i) A Soil Management Plan (SMP) must be prepared by an LSP in accordance with the remediation waste management procedures of the MCP (310 CMR 40.0030 *et seq*) and implemented at the commencement of any activity that may disturb soil or groundwater located at the property. The SMP should include, at a minimum, the following elements: identification of the type and location of hazardous materials in the soil or a sampling and analysis plan (if insufficient data is available), handling procedures, description of staging and storage areas, transportation and treatment/disposal methods, spill prevention and control measures, and a contingency plan. The SMP should be available at the property throughout the course of soil disturbance and handling activities; and,

(ii) A Health and Safety Plan (HASP) must be prepared by a Certified Industrial Hygienist, or other qualified individual sufficiently trained in worker health and safety requirements, and implemented prior to the commencement of any activity that may disturb the soil located at the property. The HASP shall include, at a minimum, the following elements: identification of the type and location of hazardous materials in the soil and/or groundwater, personnel training requirements, personal protection equipment to be used, monitoring devices and procedures, site control measures, decontamination plan, and emergency/contingency plan.

LSP Certification

Name of Organization:	Brown and Caldwell
LSP Name:	Charles Myette #3264
Title:	Vice President
Telephone:	(978) 794-0336

I attest that I have personally examined and am familiar with the information contained in this Activity and Use Limitation Opinion, included the Risk Characterization and Notice of Activity and Use Limitation accompanying this attestation, and in my professional judgement, the Risk Characterization, Notice of Activity and Use Limitation, and this Activity and Use Limitation Opinion comply with the provisions of M.G.L. c. 21A, §§19-19J, 309 CMR, M.G.L. c. 21E, 310 CMR 40.0000, and all the other regulations, orders, permits, and approvals applicable to such response actions. I am aware that significant penalties may results, including, but not limited to, possible fines and imprisonment, if I willfully submit information which I know to be false, inaccurate, or incomplete.

LSP Signature: Charles Myette

Date: 9/1/05

License Number: 3264

APPENDIX C

PCDDS AND PCDFS DATA REVIEW

TRC Environmental Corporation

Memo

To: Mark Casey

From: Deb Truini

CC: E. Denly

Date: June 16, 2006

Re: PCDDs and PCDFs Data Review: Former Lawrence Thermal Conversion Facility, Lawrence, MA (RTN 3-19158)

SUMMARY

Limited data review was performed on 11 sets of dioxin and furan data from three different laboratories on various groundwater, soil, and sediment samples collected at the Former Lawrence Thermal Conversion Facility located in Lawrence, Massachusetts (RTN 3-19158). The data were reviewed for method compliance and any serious quality control (QC) nonconformances. The samples were collected from 1999 to 2003.

In general, the data are valid as reported and may be used for decision-making purposes. Minor QC nonconformances included trace levels of blank contamination, high laboratory control sample recoveries, low surrogate recoveries, quantitation at concentrations exceeding the instrument calibration range, and matrix interference. If data validation had been performed, these selected data points would likely only be qualified as estimated; however; potential low or high biases may exist which may warrant further evaluation before the data are used for a risk assessment. One significant QC nonconformance was noted in one soil sample (CL-SS1-TP2) where detector saturation was discovered; a more in-depth review of the data showed that this nonconformance may result in the qualification of results as estimated or may even potentially result in rejection of the results due to a severe low bias.

It should also be noted that the different laboratories used various methods for calculation of the TEQs and therefore, the laboratory calculated TEQs are not comparable. In addition, TEQs were not calculated in accordance with MassDEP guidelines and a calculation error was noted in a spot check of one TEQ. Prior to a risk assessment being performed, it is recommended that all TEQs be recalculated in accordance with MassDEP guidelines.

The following tables provide a summary of the data reviewed for this program.

Alta Analytical: Soil Samples Collected August 1999	
Method Used	SW-846 8290
Soil Samples	SS-1-0/0.5, SS-2-0/0.5, SS-3-0/0.5, SS-4-0/0.5, SS-5-0/0.5, SS-6-0/0.5, SS-7-0/0.5, SS-8-0/0.5, SS-9-0/0.5, SS-10-0/0.5, SS-11-0/0.5, SS-12-0/0.5, SS-13-0/0.5, Blind Duplicate (of SS-13-0/0.5)
Aqueous QC Samples	Equipment Blank
Data Available for Review	Result summary forms
QC Summary	(1) Soil method blank had low level concentrations of OCDD and OCDF. Aqueous method blank was clean. Low levels of 1,2,3,4,6,7,8-HpCDD, OCDD, 1,2,3,4,6,7,8-HpCDF, OCDF, total HpCDD, total HpCDF were detected in the equipment blank. (2) LCS (OPR): recoveries okay (3) Surrogates: recoveries okay (4) Field duplicate RPDs are reasonable
Calculation of TEQs	Laboratory appeared to only include detected compounds in the calculation of the TEQ. In a spot check of a sample that appeared to have a high TEQ, a calculation error was noticed. Sample SS-5-0/0.5 was reported with a TEQ of 360 and 13.4 was calculated during the data review. A spot check of SS-7-0/0.5 revealed similar results (reported 220 and calculated 214) during the data review. There may be other TEQ errors for this batch of data.
Other Issues	There is only a Concentration and Detection Limit column. Therefore EMPCs do not appear to be separated out for either 2,3,7,8-substituted isomers or total homolog results.
Data Qualifiers Used By Laboratory	A – The amount detected is below the method calibration limit (estimated value). D - The amount reported is the maximum possible concentration as a result of ether interference (estimated value; high bias). * - Result was reported from a dilution due to matrix interference (no bias).

Alta Analytical: Soil and Groundwater Samples Collected October 2000	
Method Used	SW-846 8290
Soil Samples	SS-1B, SS-2B, SS-2B Duplicate, SS-3B, SS-5B, SS-5C, SS-6B, SS-8B
Groundwater Samples	GW-101, GW-102, GW-103, GW-103D
Aqueous QC Samples	Equipment Blank 1 (soil), Equipment Blank 2 (soil), Equipment Blank (groundwater)
Data Available for Review	Result summary forms
QC Summary	(1) The soil method blank had low level concentrations of 1,2,3,4,6,7,8-HpCDD, OCDD, and total HpCDD. The aqueous method blank associated with Equipment Blank 1 and Equipment Blank 2 had a low level concentration of OCDD and both equipment blank samples had low level concentrations of OCDD. Aqueous method blank associated with groundwater samples was clean. (2) LCS (OPR): recoveries okay (3) Surrogates: recoveries okay (4) Field duplicate RPDs are reasonable for the soil pair and there were some differences in the groundwater pair.
Calculation of TEQs	Laboratory reported a minimum and maximum TEQ. The minimum TEQ includes detected compounds only. The maximum TEQ includes detected compounds and nondetected compounds at the value of the detection limit.
Other Issues	It is unclear if the laboratory includes EMPCs in the total homolog results.
Data Qualifiers Used By Laboratory	A – The amount detected is below the method calibration limit (estimated value). B - This compound was also detected in the blank. D - The amount reported is the maximum possible concentration as a result of ether interference (estimated value; high bias).

Triangle Laboratories: Groundwater Samples Collected December 2001	
Method Used	SW-846 8290
Groundwater Samples	CL-GW-MW102-01 (field filtered), CL-GW-MW102-01, CL-MW-MW101-02 (field filtered), CL-GW-MW101-02, CL-GW-MW103-01 (field filtered), CL-GW-MW103-01, CL-GW-MW103DUP-01 (field filtered), CL-GW-MW100-01-01 (field filtered), CL-GW-MW100-01
Aqueous QC Samples	CL-GW-FB1-01, Trip Blank
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, LCS, LCSD, method blank; ICAL and CCAL summary information (%RSDs and %Ds).
QC Summary	(1) Aqueous method blank clean. The trip and field blank samples were clean. (2) LCS and LCSD: recoveries and RPDs okay (3) Surrogates: recoveries okay (4) Field duplicate RPDs are reasonable
Calculation of TEQs	TEQs include all nondetected results at the reported value as well as EMPCs.
Other Issues	EMPCs have a separate column on the results summary sheet (for both 2,3,7,8-substituted isomers and the totals) and are reported separate from the total homolog result.
Data Qualifiers Used By Laboratory	J – The amount detected is below the lowest calibration standard (estimated value).

Triangle Laboratories: Soil Samples Collected January 2002	
Method Used	SW-846 8290
Soil Samples	CL-SS1-TP1, CL-SS2-TP1, CL-SS3-TP1
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, LCS, LCSD, method blank; ICAL and CCAL summary information (%RSDs and %Ds).
QC Summary	(1) Low level concentrations of OCDD and total TCDF were detected in the soil method blank. (2) LCS and LCSD: recoveries and RPDs okay (3) Surrogates: some low surrogates in CL-SS2-TP1
Calculation of TEQs	TEQs include all nondetected results at the reported value as well as EMPCs.
Other Issues	EMPCs have a separate column on the results summary sheet (for both 2,3,7,8-substituted isomers and the totals) and are reported separate from the total homolog result.
Data Qualifiers Used By Laboratory	J – The amount detected is below the lowest calibration standard (estimated value). B – This compound was also detected in the blank. V – Percent recovery of a surrogate was below the acceptance limits (estimated value; low bias).

Triangle Laboratories: Soil Samples Collected January 2002	
Method Used	SW-846 8290
Soil Samples	CL-SS1-TP2, CL-SS2-TP2, CL-SS3-TP2, CL-SS1-TP3, CL-SS2-TP3, CL-SS3-TP3
Aqueous QC Samples	Trip blank
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, LCS, LCSD, method blank; ICAL and CCAL summary information (%RSDs and %Ds).
QC Summary	(1) Low level concentrations of all compounds with the exception of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,4,7,8,9-HpCDF, total TCDD, and total TCDF were detected in the method blank associated with sample CL-SS1-TP2. Soil method blank associated with all remaining soil samples was clean. The aqueous method blank was clean. (2) LCS and LCSD – High recovery for 1,2,3,4,7,8,9-HpCDF in the LCSD associated with sample CL-SS1-TP2. High recoveries and RPD exceedances for 2,3,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, and 1,2,3,4,7,8,9-HpCDF in the LCS and/or LCSD associated with all remaining soil samples. High recovery of 1,2,3,4,7,8,9-HpCDF in the LCS and LCSD associated with sample Trip Blank. (3) Surrogates: recoveries okay (4) Many compounds in CL-SS1-TP2 exceeded the calibration range and in addition exceeded the normal dynamic range of the MS detection system resulting in detector saturation. These results may be biased extremely low.
Calculation of TEQs	TEQs include all nondetected results at the reported value as well as EMPCs.
Other Issues	EMPCs have a separate column on the results summary sheet (for both 2,3,7,8-substituted isomers and the totals) and are reported separate from the total homolog result.
Data Qualifiers Used By Laboratory	J – The amount detected is below the lowest calibration standard (estimated value). E – This compound concentration exceeded the instrument calibration curve (estimated value). S – This compound concentration exceeds the normal dynamic range of the MS detection system. The corresponding signal is saturated and the reported concentration is a minimum estimate (low bias or possible rejected data). X - Ether interference is present and the ether peak intensity is at least ten percent of the total furan peak intensity (estimated value – high bias).

Pacific Analytical: Soil Samples Collected April 2002	
Method Used	EPA 1613
Soil Samples	BC-SSA101, BC-SSA102, BC-SSA103, BC-SSA104, BC-SSB101, BC-SSB102, BC-SSB103, BC-SSB104
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, OPR, method blank; ICAL and CCAL summary information (%RSDs and %Ds) and raw data, resolution raw data.
QC Summary	(1) Soil method blank was clean (2) OPR – recoveries okay (3) Surrogates – Low recovery of the cleanup standard for sample BC-SSB101. Low recovery of labeled 2,3,7,8-TCDD and 2,3,7,8-TCDF as well as the cleanup standard in sample BC-SS102. (May cause low bias)
Calculation of TEQs	Not applicable since only 2,3,7,8-TCDF and 2,3,7,8-TCDD were reported.
Other Issues	No EMPCs appear to have been detected.
Data Qualifiers Used By Laboratory	None

Triangle Laboratories: Soil Samples Collected April 2002	
Method Used	SW-846 8290
Soil Samples	BC-SSA104, BC-SSA101, BC-SSA201, BC-SSA302, BC-SSA301, BC-SSA303
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, LCS, LCSD, method blank; ICAL and CCAL summary information (%RSDs and %Ds).
QC Summary	(1) Low level concentration of OCDD was detected in the soil method blank associated with sample BC-SSA104. Low level concentrations of 1,2,3,4,6,7,8-HpCDD, OCDD, 1,2,3,4,6,7,8-HpCDF, total HxCDD, total HpCDD, total HxCDF, and total HpCDF were detected in the soil method blank associated with sample BC-SSA101. Low level concentrations of OCDD, 1,2,3,4,7,8-HxCDF, and total HxCDF were detected in the soil method blank associated with samples BC-SSA201 and BC-SSA302. Low level concentrations of OCDD and OCDF were detected in the soil method blank associated with samples BC-SSA301 and BC-SSA303. (2) LCS and LCSD – High recoveries for 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF, and 2,3,4,7,8-PeCDF in the LCS and/or LCSD associated with sample BC-SS101. (3) Surrogates: Low surrogate recoveries in samples BC-SSA302, BC-SSA301, and BC-SSA303 (May cause low bias) (4) Many compounds in samples BC-SSA101, BC-SSA201, BC-SSA302, and BC-SSA301 exceeded the calibration range but did not exceed the normal dynamic range of the MS detection system resulting in detector saturation. These results may be biased low. (5) Samples were received at the laboratory at a temperature of 17° C. In addition, none of the samples were extracted within 30 days of collection (extracted 3-6 months after collection).
Calculation of TEQs	TEQs include all nondetected results at the reported value as well as EMPCs.
Other Issues	EMPCs have a separate column on the results summary sheet (for both 2,3,7,8-substituted isomers and the totals) and are reported separate from the total homolog result.
Data Qualifiers Used By Laboratory	J – The amount detected is below the lowest calibration standard (estimated value). B – This compound was also detected in the blank. V – Percent recovery of a surrogate was below the acceptance limits (estimated value; low bias). E – This compound concentration exceeded the

Triangle Laboratories: Soil Samples Collected April 2002	
	instrument calibration curve (estimated value). X – Ether interference is present and the ether peak intensity is at least ten percent of the total furan peak intensity (estimated value – high bias).

Triangle Laboratories: Soil Samples Collected November 2002	
Method Used	SW-846 8290
Soil Samples	BC-SSA301A
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, LCS, LCSD, method blank; ICAL and CCAL summary information (%RSDs and %Ds).
QC Summary	(1) Low level concentrations of 2,3,7,8-TCDD, OCDD, 1,2,3,7,8-PeCDF, OCDF, total TCDD, total HxCDD, and total PeCDF were detected in the soil method blank associated with sample BC-SSA301A (2) LCS and LCSD – High recoveries for 2,3,4,7,8-PeCDF in the LCS and LCSD associated with sample BC-SSA301A. (3) Surrogates – Low surrogate recoveries in sample BC-SS301A (possible low bias). There was interference on one of the recovery standards in sample BC-SSA301A. (4) Several compounds in sample BC-SSA301A exceeded the calibration range but did not exceed the normal dynamic range of the MS detection system resulting in detector saturation. These results may be biased low.
Calculation of TEQs	TEQs include all nondetected results at the reported value as well as EMPCs.
Other Issues	EMPCs have a separate column on the results summary sheet (for both 2,3,7,8-substituted isomers and the totals) and are reported separate from the total homolog result.
Data Qualifiers Used By Laboratory	V - Percent recovery of a labeled compound was below QC recovery limit (estimated value – low bias). I – Labeled standards have been interfered with on the GC column by coeluting interferent peaks (estimated value; low bias). E – This compound concentration exceeded the instrument calibration curve (estimated value).

Triangle Laboratories: Sediment Samples Collected November 2002	
Method Used	SW-846 8290
Soil Samples	BC- SED-303, BC-SED-OUTFALL1
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, LCS, LCSD, method blank; ICAL and CCAL summary information (%RSDs and %Ds).
QC Summary	(1) Low level concentration of OCDF was detected in the sediment method blank associated with both samples. (2) LCS and LCSD – recoveries and RPDs okay (3) Surrogates – Low surrogate recoveries in sample BC-SED-OUTFALL1 (may cause low bias).
Calculation of TEQs	TEQs include all nondetected results at the reported value as well as EMPCs.
Other Issues	EMPCs have a separate column on the results summary sheet (for both 2,3,7,8-substituted isomers and the totals) and are reported separate from the total homolog result.
Data Qualifiers Used By Laboratory	J – The amount detected is below the lowest calibration standard (estimated value). V – Percent recovery of a surrogate was below the acceptance limits (estimated value; low bias). X - Ether interference is present and the ether peak intensity is at least ten percent of the total furan peak intensity (estimated value – high bias).

Triangle Laboratories: Sediment Samples Collected July 2003	
Method Used	SW-846 8290
Soil Samples	SP-BG-1, SP-BG-2, SP-BG-3, SP-BG-4
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, LCS, LCSD, method blank; ICAL and CCAL summary information (%RSDs and %Ds).
QC Summary	(1) Sediment method blank was clean (2) LCS and LCSD – recoveries and RPDs okay (3) Surrogates – Low surrogate recoveries in sample SP-BG-3 (may cause low bias). (4) One compound in sample SP-BG-3 exceeded the calibration range but did not exceed the normal dynamic range of the MS detection system resulting in detector saturation. This result may be biased low.
Calculation of TEQs	TEQs include all nondetected results at the reported value as well as EMPCs.
Other Issues	EMPCs have a separate column on the results summary sheet (for both 2,3,7,8-substituted isomers and the totals) and are reported separate from the total homolog result.
Data Qualifiers Used By Laboratory	J – The amount detected is below the lowest calibration standard (estimated value). V – Percent recovery of a surrogate was below the acceptance limits (estimated value; low bias). E – This compound concentration exceeded the instrument calibration curve (estimated value). X - Ether interference is present and the ether peak intensity is at least ten percent of the total furan peak intensity (estimated value – high bias).

Triangle Laboratories: Sediment Samples Collected July 2003	
Method Used	SW-846 8290
Soil Samples	SP-3 (6/11/03 extraction), SP-9, SP-74, DUP, SP-62, SP-3 (7/7/03 extraction), SP-11, SP-65, SP-71, SP-53, SP-56
Data Available for Review	Results summary forms, quantitation reports and chromatograms for each sample, LCS, LCSD, method blank; ICAL and CCAL summary information (%RSDs and %Ds).
QC Summary	(1) Low level concentration of OCDD, 1,2,3,4,7,8-HxCDF, total TCDD, total PeCDD, total HxCDD, total HpCDD, and total HxCDF were detected in the sediment method blank associated with samples SP-3 (6/11/03 extraction), SP-9, SP-74, DUP, and SP-62. The sediment blank associated with all remaining sediments was clean. (2) LCS and LCSD – recoveries and RPDs okay (3) Surrogates – Low surrogate recoveries in samples SP-3 (6/11/03 extraction), SP-9, SP-74, SP-62, SP-11, SP-71, SP-53, and SP-56 (may cause low bias). (4) Field duplicate (appears to be a duplicate of SP-74) RPDs appear to have some discrepancies. (5) Several compounds in samples SP-9, SP-74, and DUP exceeded the calibration range but did not exceed the normal dynamic range of the MS detection system resulting in detector saturation. These results may be biased low. (6) Sediment sample SP-3 was extracted twice (on 6/11/03 and 7/7/03) and the 7/7/03 extraction results are significantly lower than the initial 6/11/03 results.
Calculation of TEQs	TEQs include all nondetected results at the reported value as well as EMPCs.
Other Issues	EMPCs have a separate column on the results summary sheet (for both 2,3,7,8-substituted isomers and the totals) and are reported separate from the total homolog result.
Data Qualifiers Used By Laboratory	J – The amount detected is below the lowest calibration standard (estimated value). E – This compound concentration exceeded the instrument calibration curve (estimated value). V – Percent recovery of a surrogate was below the acceptance limits (estimated value; low bias). X - Ether interference is present and the ether peak intensity is at least ten percent of the total furan peak intensity (estimated value –high bias).

APPENDIX D

FOCUSED METHOD 3 RISK CHARACTERIZATION FOR RECREATIONAL USE

FOCUSED METHOD 3 RISK CHARACTERIZATION FOR RECREATIONAL USE

TRC conducted a focused Method 3 Risk Characterization to evaluate whether the presence of hazardous substances identified at the Site poses an unacceptable risk to human health associated with recreational use of the property. This focused Method 3 Risk Characterization was performed in accordance with the requirements for MCP Method 3 Risk Characterization (310 CMR 40.0990) and general methods and procedures outlined in applicable guidance documents developed by the MADEP (1995, 2006) with respect to the evaluation of a recreational receptor who conducts recreational activities at the property, including recreational fishing in Stevens Pond. The recreational receptors are assumed to conduct recreational activities at the property where they may be exposed to surface soil. The recreational receptor is also assumed to ingest fish caught in Stevens Pond while recreating at the property.

This Method 3 Risk Characterization was conducted using the analytical data for surface soil summarized in the RAO Report (B&C, 2005). Soil data representative of surface soil (i.e., from 0 to 3 feet below ground surface) was used to characterize potential exposure by recreational users. Fish tissue analytical data were taken from the MCP Method 3 Risk Characterization (Menzie-Cura, 2005).

The exposure point concentration (EPC) for each chemical detected in surface soil was calculated as the arithmetic mean concentration or the appropriate upper confidence limit of the mean (UCL). The arithmetic mean concentration was used as the EPC if the arithmetic mean concentration was below the US Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goal for residential exposure, 75% of the data was below the arithmetic mean and no concentration exceeded 10 times the arithmetic average. If these conditions were not met, the appropriate UCL of the mean was calculated using ProUCL (USEPA 2004) and used as the EPC. Table D-1 lists the summary statistics and identifies the EPC used for each chemical detected in surface soil. The EPCs for fish tissue used in the existing MCP Method 3 Risk Characterization Report (Menzie-Cura, 2005) were used for chemicals detected in fish tissue. Table D-2 lists the EPC used for fish tissue.

In order to evaluate the potential for unacceptable risks associated with proposed recreational use of the property, recreational receptors, comprised of a child 1 to 8 years old, a youth 8 to 15 years old and an adult 15 to 31 years old (MADEP 2006), were assumed to visit the site for 3 days per week for 28 weeks per year. The recreational receptor was assumed to recreate at the property as a child and continue to do so as a youth and adult for a total exposure period of 30 years. Each receptor was assumed to be exposed to hazardous substances in soil through the incidental ingestion, dermal contact and inhalation of particulates exposure pathways and through the ingestion of fish tissue from fish caught in Stevens Pond while recreating at the property. Fish tissue from fish caught at Stevens Pond was assumed to comprise 25% of recreational fish consumed by each receptor.

Cancer risk estimates and noncancer hazard quotients (HQs) were calculated for each chemical detected in surface soil and fish tissue for each exposure pathway. Cumulative cancer risk estimates were calculated as the sum of the individual cancer risk estimates for each chemical across all exposure pathways and for the combined child, youth and adult recreational receptor.

Hazard indices (HIs) were also calculated as the sum of the HQs across all exposure pathways and for the combined child, youth and adult recreational receptor.

Exposure to Soil

As shown on Table D-3, the results of this focused Method 3 Risk Characterization indicate an unacceptable cumulative cancer risk for the combined child, youth and adult receptor associated with exposure to surface soil of 3E-05, which is above the acceptable cancer risk level of 1E-05. The noncancer hazard index, which is the sum of the HQs for each individual chemical, was 5.4E-01, which is below the acceptable HI of 1E+00. The chemicals contributing significantly to the unacceptable cancer risk estimate are arsenic and benzo(a)pyrene through the incidental ingestion and dermal contact exposure pathways(cancer risk estimate across exposure pathways of 7E-06 and 8E-06, respectively).

Ingestion of Fish

As shown on Table D-4, the cumulative cancer risk estimate for the combined child, youth and adult recreational receptor who ingestions fish tissue from fish caught in Stevens Pond while recreating at the property is 3E-06, which is below the acceptable cancer risk level of 1E-05. The cumulative HI is 7.3E-01, which is below the acceptable HI of 1E+00.

Combined Risk

The cumulative cancer risk level associated with exposure to both soil and fish tissue for the combined child, youth and adult recreational receptor is 3.3E-5, with the majority of the cancer risk from arsenic and benzo(a)pyrene in soil and dioxin/furans in fish tissue.

The cumulative HI for exposure to soil and fish tissue is 1.3E+00, which slightly exceeds the acceptable HI of 1E+00. The chemicals contributing to this HI are arsenic and copper in soil (HIs of 4.2E-01 and 1.1E-01, respectively) and mercury in fish tissue (HI of 6.8E-01). These chemicals affect different organs or systems.

- Arsenic is reported to cause skin and vascular effects.
- Copper is reported to cause gastrointestinal irritation (USEPA 1997).
- Mercury is reported to cause neurotoxicity.

Because these chemicals affect different organs or systems, HIs associated with specific target organ or system effects are below the acceptable HI of 1E+00.

References

MADEP, 1995. Guidance for Disposal Site Risk Characterization. BWSC/ORS-95-141. July.

MADEP 2006. Massachusetts Contingency Plan. Massachusetts Department of Environmental Protection. April 2006.

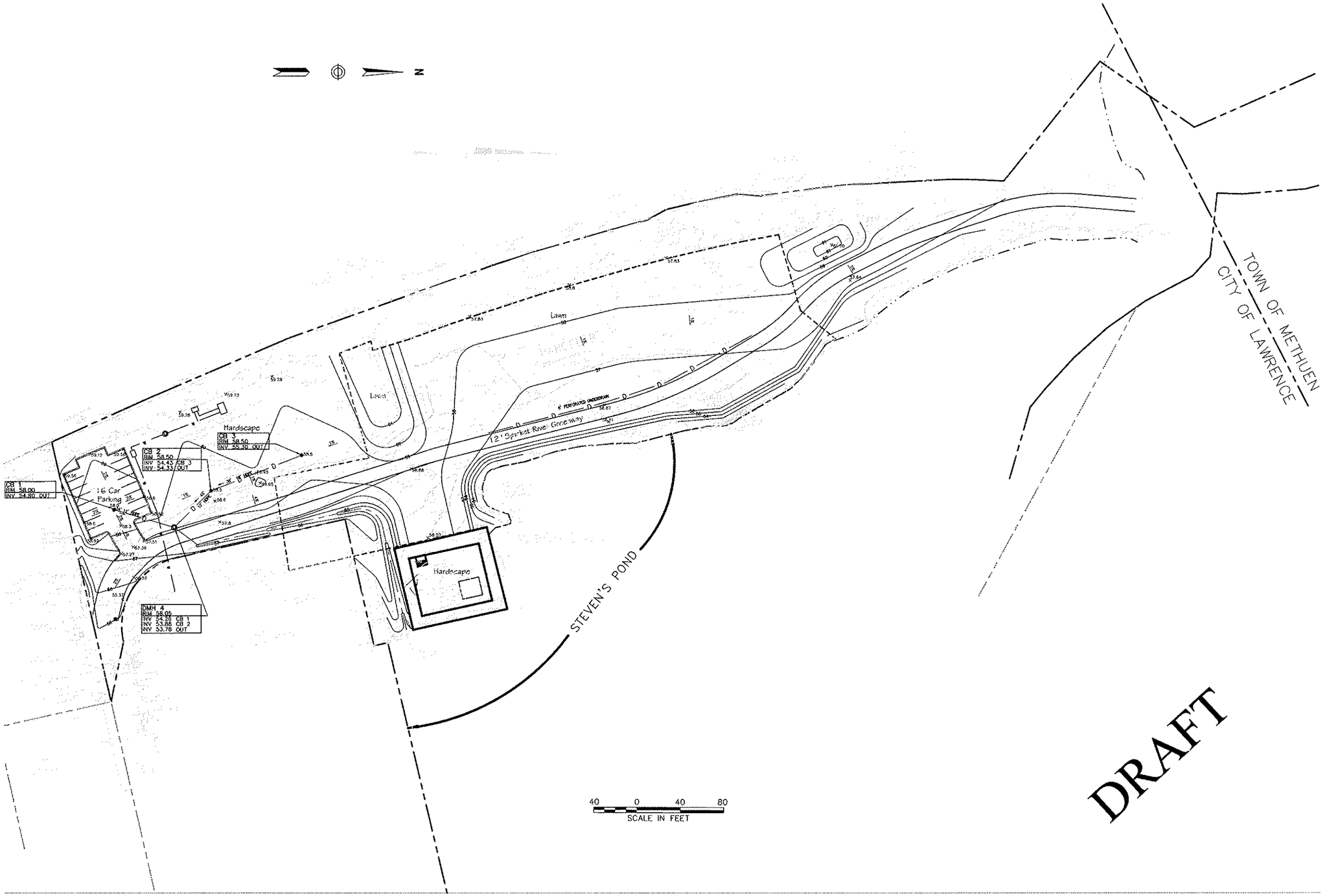
Menzie-Cura & Associates, Inc., 2005. MCP Method 3 Risk Characterization, Final Draft Report, Former Lawrence Thermal Conversion Facility, Lawrence, Massachusetts, April 6, 2005.

USEPA 1997. Health Effects Assessment Summary Tables. US Environmental Protection Agency, Office of Research and Development. July.

USEPA 2004. ProUCL User's Guide, US Environmental Protection Agency, Technical Support Center for Monitoring and Site Characterization. Las Vegas. EPA/600/R04/079, April.

APPENDIX E

CONCEPTUAL PARK DEVELOPMENT OPTIONS



TEC, Inc.
65 Glenn Street
Lawrence, MA 01843
Tel (978) 794-1792
Fax (978) 794-1793
www.tecmass.com

DESIGNED BY	BAW/DW
DRAWN BY	BAW
CHECKED BY	JPT
DATE	23 SEPT 08
SCALE	1"=40'

PREPARED FOR

---, MA

REVISIONS

ISSUED FOR
Permitting

PROJECT TITLE
Manchester Street Park

PROJECT LOCATION
Lawrence, Massachusetts

DRAWING TITLE
Grading and Drainage Plan

PROJECT NO.
T0322

TEC CAD FILE
T0322_GD.dwg

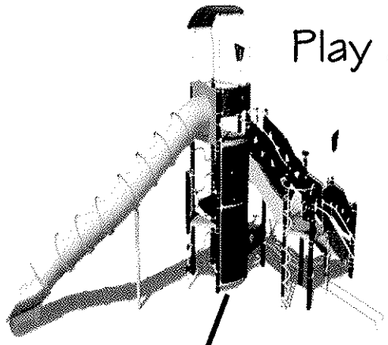
DRAWING NO.
C-5

SHEET 5 OF 6

APPENDIX F

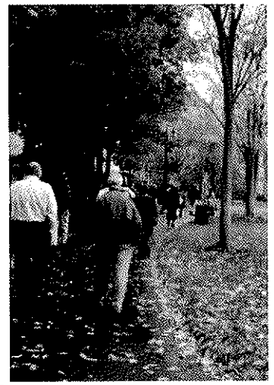
MANCHESTER STREET PARK CONSTRUCTION PLAN

Community Garden

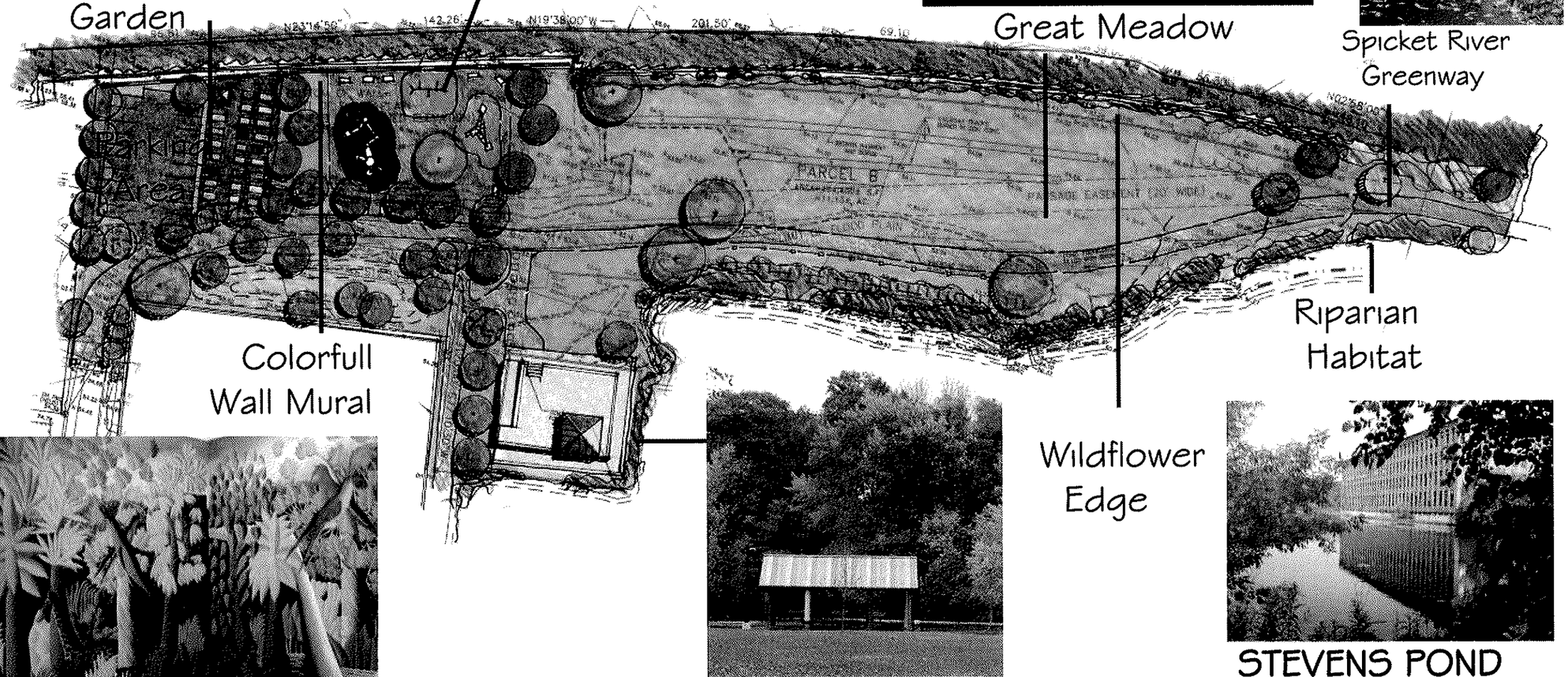


Play Area

Great Meadow



Spicket River Greenway



Manchester Street Park

LAWRENCE, MA October 8, 2008

PLANNERS COLLABORATIVE

TRC TEC

APPENDIX G

BUREAU OF WASTE SITE CLEANUP FORMS

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC107

TIER CLASSIFICATION TRANSMITTAL FORM

Pursuant to 310 CMR 40.0500 (Subpart E)

Release Tracking Number
3 - 19158

A. DISPOSAL SITE LOCATION:

1. Disposal Site Name: NO LOCATION AID

2. Street Address: 85 MANCHESTER ST

3. City/Town: LAWRENCE 4. ZIP Code:

B. THIS FORM IS BEING USED TO: (check all that apply)

☐ 1. Submit a new **Tier Classification Submittal for a Tier I Site**, including a **Numerical Ranking Scoresheet** (BWSC107A) (check one) A Tier I Permit Application must also be submitted.

☐ a. Tier IA ☐ b. Tier IB ☐ c. Tier IC

☐ 2. Submit a new **Tier Classification Submittal for a Tier II Site**, including the **Numerical Ranking Scoresheet** (BWSC107A) and the **Tier II Compliance History** (BWSC107B)

☐ 3. Submit a **Phase I Completion Statement** as per 310 CMR 40.0480

If previously submitted, provide date _____ mm/dd/yyyy

☐ 4. Submit a **Phase II Scope of Work** as per 310 CMR 40.0834

If previously submitted, provide date _____ mm/dd/yyyy

☐ 5. Submit a **Phase II Conceptual Scope of Work supporting a Tier Classification Submittal**

☑ 6. Submit a **Tier II Extension Submittal** for Response Actions at a Tier II Site including the **Tier II Compliance History** (BWSC107B)

☐ 7. Submit a **Tier II Transfer Submittal** for a change in person(s) undertaking Response Actions at a Tier II Site including the **Tier II Compliance History** (BWSC107B) and the **Tier II Transferor Certification** (BWSC107C)

Proposed effective date of transfer : _____
mm/dd/yyyy

☐ 8. Submit a **Revised Tier Classification Submittal,** including a **Numerical Ranking Scoresheet** (BWSC107A) A Major Permit Modification may also need to be submitted.

If this revised submittal is re-classifying the site check the new classification.

☐ a. Tier IA ☐ b. Tier IB ☐ c. Tier IC ☐ d. Tier II

☐ 9. Submit a **Notice that an additional Release Tracking Number(s) is (are) being linked to this Tier Classified Site** (Primary RTN). Future response actions addressing the Release or Threat of Release notification condition associated with additional Release Tracking Numbers (RTNs) will be conducted as part of the Response Actions planned or ongoing at the Primary Site listed above. For a previously Tier Classified Primary Site, if there is a reasonable likelihood that the addition of the new secondary RTN(s) would change the classification of the site, a **Revised Tier Classification Submittal** must also be made.

Provide Release Tracking Number(s): a. ☐ - ☐ b. ☐ - ☐

All future Response Actions must occur according to the deadlines applicable to the Primary RTN. Use only the Primary RTN when making future submittals for this site unless specifically relating to response actions started before the linking occurred.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC107

TIER CLASSIFICATION TRANSMITTAL FORM
Pursuant to 310 CMR 40.0500 (Subpart E)

Release Tracking Number
3 - 19158

C. LSP SIGNATURE AND STAMP:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and 309 CMR4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> *if Section B of this form indicates that a* ***Tier I or Tier II Classification Submittal*** *including the* ***Numerical Ranking System Scoresheet*** *is being submitted*, this Tier Classification Submittal has been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B of this form indicates that a* ***Phase I Completion Statement*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B of this form indicates that a* ***Phase II Scope of Work*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B of this form indicates that a* ***Tier II Extension Submittal*** *or a* ***Tier II Transfer Submittal*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP #: 9495

2. First Name: MATTHEW E 3. Last Name: ROBBINS

4. Telephone: 5089235120 5. Ext.: 6. FAX:

7. Signature:

8. Date:
mm/dd/yyyy

9. LSP Stamp:

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC107

Release Tracking Number
3 - 19158

TIER CLASSIFICATION TRANSMITTAL FORM

Pursuant to 310 CMR 40.0500 (Subpart E)

D. PERSON MAKING SUBMITTAL:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☑ c. change in the person undertaking response actions

2. Name of Organization: City of Lawrence

3. Contact First Name: 4. Last Name:

5. Street: 6. Title:

7. City/Town: Lawrence 8. State: MA 9. ZIP Code:

10. Telephone: 11. Ext.: 12. FAX:

E. RELATIONSHIP OF PERSON MAKING SUBMITTAL TO DISPOSAL SITE:

☑ 1. RP or PRP ☑ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☐ e. Other RP or PRP Specify:

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Making Submittal Specify Relationship:

F. REQUIRED ATTACHMENT AND SUBMITTALS:

☐ 1. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

☑ 2. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the submittal of any Phase Reports to DEP.

☑ 3. Check here to certify that a Legal Notice of a Tier Classification or Re-classification Submittal has been or will be made according to 310 CMR 40.1403, and a copy of the notice sent to DEP, the Chief Municipal Officer and the Local Board of Health.

☑ 4. For a Tier II Extension Submittal, check here to certify that a statement summarizing why a Permanent or Temporary Solution has not been achieved at the Disposal Site is attached.

☐ 5. For a Tier II Transfer Submittal, check here to certify that a statement summarizing the reasons for the proposed change in person(s) undertaking the Response Actions is attached. All Response Actions must be completed by the deadline applicable to the person who first filed either a Tier Classification Submittal for the Disposal Site or received a Waiver of Approvals.

☐ 6. Check here if any non-updatable information provided on this form is incorrect, e.g. Release Address/Location Aid. Send corrections to the DEP Regional Office.

☑ 7. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC107

Release Tracking Number
3 - 19158

TIER CLASSIFICATION TRANSMITTAL FORM
Pursuant to 310 CMR 40.0500 (Subpart E)

G. CERTIFICATION OF PERSON MAKING SUBMITTAL:

1. I, _____, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

If submitting a Tier II Classification, Extension or Transfer, I also attest under the pains and penalties of perjury that (i) I/the person(s) or entity(ies) on whose behalf this submittal is made has/have personally examined and am/is familiar with the requirements of M.G.L. c. 21E and 310 CMR 40.0000; (ii) based upon my inquiry of the/those Licensed Site Professional(s) employed or engaged to render Professional Services for the disposal site which is the subject of this Transmittal Form and of the person(s) or entity(ies) on whose behalf this submittal is made, and my/that person's(s') or entity's(ies') understanding as to the estimated costs of necessary response actions, that/those person(s) or entity(ies) has/have the technical, financial and legal ability to proceed with response actions for such site in accordance with M.G.L. c. 21E, 310 CMR 40.0000 and other applicable requirements; and (iii) that I am fully authorized to make this attestation on behalf of the person(s) or entity(ies) legally responsible for this submittal. I/the person(s) or entity(ies) on whose behalf this submittal is made is aware of the requirements in 310 CMR 40.0172 for notifying the Department in the event that I/the person(s) or entity(ies) on whose behalf this submittal is made learn(s) that it/they is/are unable to proceed with the necessary response actions.

2. By: _____ 3. Title: _____

Signature

4. For: City of Lawrence 5. Date: _____

(Name of person or entity recorded in Section D) mm/dd/yyyy

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section D.

7. Street: _____

8. City/Town: _____ 9. State: _____ 10. ZIP Code: _____

11. Telephone: _____ 12. Ext.: _____ 13. FAX: _____

YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO $10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY):

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC108

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number: 3 - 19158

A. SITE LOCATION:

1. Site Name: NO LOCATION AID
2. Street Address: 85 MANCHESTER ST
3. City/Town: LAWRENCE 4. ZIP Code:
5. UTM Coordinates: a. UTM N: 4731307 b. UTM E: 321424
6. ☑ Check here if a Tier Classification Submittal has been provided to DEP for this disposal site.
   ☐ a. Tier IA ☐ b. Tier IB ☐ c. Tier IC ☑ d. Tier II
7. If applicable, provide the Permit Number: _____

B. THIS FORM IS BEING USED TO: (check all that apply)

☐ 1. Submit a **Phase I Completion Statement**, pursuant to 310 CMR 40.0484.

☐ 2. Submit a **Revised Phase I Completion Statement**, pursuant to 310 CMR 40.0484.

☐ 3. Submit a **Phase II Scope of Work**, pursuant to 310 CMR 40.0834.

☐ 4. Submit an **interim Phase II Report**. This report does not satisfy the response action deadline requirements in 310 CMR 40.0500.

☐ 5. Submit a **final Phase II Report and Completion Statement**, pursuant to 310 CMR 40.0836.

☐ 6. Submit a **Revised Phase II Report and Completion Statement**, pursuant to 310 CMR 40.0836.

☑ 7. Submit a **Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862.

☐ 8. Submit a **Revised Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862.

☑ 9. Submit a **Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874.

☐ 10. Submit a **Modified Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874.

☐ 11. Submit an **As-Built Construction Report**, pursuant to 310 CMR 40.0875.

☐ 12. Submit a **Phase IV Status Report**, pursuant to 310 CMR 40.0877.

☐ 13. Submit a **Phase IV Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879.

Specify the outcome of Phase IV activities: (check one)

☐ a. Phase V Operation, Maintenance or Monitoring of the Comprehensive Remedial Action is necessary to achieve a Response Action Outcome.

☐ b. The requirements of a Class A Response Action Outcome have been met. No additional Operation, Maintenance or Monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.

☐ c. The requirements of a Class C Response Action Outcome have been met. No additional Operation, Maintenance or Monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.

☐ d. The requirements of a Class C Response Action Outcome have been met. Further Operation, Maintenance or Monitoring of the remedial action is necessary to ensure that conditions are maintained and that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.

(All sections of this transmittal form must be filled out unless otherwise noted above)

B. THIS FORM IS BEING USED TO (cont.): (check all that apply)

☐ 14. Submit a **Revised Phase IV Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879.

☐ 15. Submit a **Phase V Status Report**, pursuant to 310 CMR 40.0892.

☐ 16. Submit a **Remedial Monitoring Report**. (This report can only be submitted through eDEP.)

a. Type of Report: (check one) ☐ i. Initial Report ☐ ii. Interim Report ☐ iii. Final Report

b. Frequency of Submittal: (check all that apply)

☐ i. A Remedial Monitoring Report(s) submitted monthly to address an Imminent Hazard.

☐ ii. A Remedial Monitoring Report(s) submitted monthly to address a Condition of Substantial Release Migration.

☐ iii. A Remedial Monitoring Report(s) submitted concurrent with a Status Report.

c. Status of Site: (check one) ☐ i. Phase V ☐ ii. Remedy Operation Status ☐ iii. Class C RAO

d. Number of Remedial Systems and/or Monitoring Programs: ____

A separate BWSC108A, CRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.

☐ 17. Submit a **Remedy Operation Status**, pursuant to 310 CMR 40.0893.

☐ 18. Submit a **Status Report to maintain a Remedy Operation Status**, pursuant to 310 CMR 40.0893(2).

☐ 19. Submit a **Modification of a Remedy Operation Status**, pursuant to 310 CMR 40.0893(5).

☐ 20. Submit a **Termination of a Remedy Operation Status**, pursuant to 310 CMR 40.0893(6).

☐ 21. Submit a **Phase V Completion Statement**, pursuant to 310 CMR 40.0894.

Specify the outcome of Phase V activities: (check one)

☐ a. The requirements of a Class A Response Action Outcome have been met. No additional Operation, Maintenance or Monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC104) will be submitted to DEP.

☐ b. The requirements of a Class C Response Action Outcome have been met. No additional Operation, Maintenance or Monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.

☐ c. The requirements of a Class C Response Action Outcome have been met. Further Operation, Maintenance or Monitoring of the remedial action is necessary to ensure that conditions are maintained and/or that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.

☐ 22. Submit a **Revised Phase V Completion Statement**, pursuant to 310 CMR 40.0894.

☐ 23. Submit a **Post-Class C Response Action Outcome Status Report**, pursuant to 310 CMR 40.0898.

(All sections of this transmittal form must be filled out unless otherwise noted above)

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC108

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number: 3 - 19158

C. LSP SIGNATURE AND STAMP:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and 309 CMR 4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> *if Section B indicates that a* ***Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that a* ***Phase II Scope of Work*** *or a* ***Phase IV Remedy Implementation Plan*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B indicates that an* ***As-Built Construction Report, a Remedy Operation Status****,a* ***Phase IV, Phase V or Post-Class C RAO Status Report, a Status Report to Maintain a Remedy Operation Status*** *and/or a* ***Remedial Monitoring Report*** *is being submitted*, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP #: 9495

2. First Name: MATTHEW E 3. Last Name: ROBBINS

4. Telephone: 5089235120 5. Ext.: 6. FAX:

7. Signature:

8. Date: (mm/dd/yyyy)

9. LSP Stamp:

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC108

Release Tracking Number
3 - 19158

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

D. PERSON UNDERTAKING RESPONSE ACTIONS:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☑ c. change in the person undertaking response actions

2. Name of Organization: CITY OF LAWRENCE

3. Contact First Name: 4. Last Name:

5. Street: 6. Title:

7. City/Town: LAWRENCE 8. State: MA 9. ZIP Code:

10. Telephone: 11. Ext.: 12. FAX:

E. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTIONS:

☑ 1. RP or PRP ☑ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☐ e. Other RP or PRP Specify:

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Undertaking Response Actions Specify Relationship:

F. REQUIRED ATTACHMENT AND SUBMITTALS:

☐ 1. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

☐ 2. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the submittal of any Phase Reports to DEP.

☑ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase III Remedial Action Plan.

☑ 4. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase IV Remedy Implementation Plan.

☐ 5. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of any field work involving the implementation of a Phase IV Remedial Action.

☐ 6. If submitting a Modification of a Remedy Operation Status, check here to certify that a statement detailing the compliance history, as per 310 CMR 40.0893(5), for the person making this submittal is attached.

☐ 7. If submitting a Modification of a Remedy Operation Status, check here to certify that written consent of the person who submitted the Remedy Operation Status submittal, as per 310 CMR 40.0893(5), is attached.

☐ 8. Check here if any non-updatable information provided on this form is incorrect, e.g. Site Name. Send corrections to the DEP Regional Office.

☑ 9. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC108

Release Tracking Number
3 - 19158

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

G. CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTIONS:

1. I, _____ , attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By: _____ (Signature) 3. Title: _____

4. For: CITY OF LAWRENCE (Name of person or entity recorded in Section D) 5. Date: _____ (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section D.

7. Street: _____

8. City/Town: _____ 9. State: _____ 10. ZIP Code: _____

11. Telephone: _____ 12. Ext.: _____ 13. FAX: _____

YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO $10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)